INDUSTRIAL-ARTS MAGAZINE

Vol. 1 MAY, 1914 No. 5

THE LIVING ROOM.

THE MODEL APARTMENT IN THE WASHINGTON IRVING HIGH SCHOOL

Ada Roe

IT is the aim of the Washington Irving High School in New York City, that education shall include the cultivation of such habits and manners as will refine the home and home-life. The Model Apartment, in the Department of Home Economics, is an important means to that end.

The Model Apartment, as shown in the accompanying diagram, consists of typical rooms finished in golden oak. There is a false window in the living room, dining room, bed room, kitchen and nursery for the purpose of showing the proper treatment of windows. There is also a row of electric lights concealed behind the cornice, controlled by a switch at the right of each room. The walls are made of composition board, so that removable wall-coverings may be conveniently adjusted with thumb-tacks, and changed to suit the different color schemes. In order to conceal the thumb-tacks, a molding on hinges, opening outward, surrounds each wall-space. When wallpaper is used for covering, it is pasted upon pieces of strong, thin muslin which have been cut to fit the various wall-spaces. This facilitates putting up and prevents tearing. In order to vary the color schemes, there are two or more sets of furnishings for each room which we arrange according to the outline below.

The Living Room.

The living room has three sets of furniture, oak, mahogany and green wicker. A cot with different covers is used as a couch. There are three plain rugs and two of mixed colors, four changes of wall covering, six sets of hangings of which three are plain and three are figured material. With these furnishings we make the following color schemes:

1. Contrasting Harmonies—
   - (a) Furniture, mahogany.
     Walls, yellow (grayed; light).
     Rug, green-blue (grayed; dark).
     Hangings, cretonne, red, green-blue, yellow (grayed; value between that of rug and walls).
     Ornaments, brass fern-dish, brass lamp with old rose shade, brass desk-set, purple flower in brass vase, pictures.
   - (b) Furniture, mahogany.
     Walls, yellow-green (grayed; light).
     Rug, yellow-green (grayed; dark).
     Hangings, cretonne, red, green and yellow (grayed; value between that of rug and walls).
     Ornaments, same as in (a) with yellow lamp shade.
   - (c) Furniture, mahogany.
     Walls, blue and white stripe (grayed; light).
     Rug, blue and brown mixture.
     Hangings, blue silk rep (grayed; value between that of rug and walls).
     Ornaments, same as in (a) with yellow flower in gray-blue vase.
   - (d) Furniture, golden oak.
     Walls, blue and white stripe (grayed; light).
     Rug, blue and brown mixture.
     Hangings, brown and gold silk rep.
     Ornaments, brass lamp with yellow shade, pale pink flower in dull blue vase, sofa cushions, red, yellow and blue (grayed).
   - (e) Furniture, golden oak.
     Walls, yellow-green (grayed; light).
     Rug, yellow-green (grayed; dark).
     Hangings, cretonne, red, green and yellow.
     Ornaments, purple flower in pewter vase, pictures.
   - (f) Furniture, golden oak.
     Walls, yellow (grayed; light).
     Rug, green-blue (grayed; dark).
     Hangings, cretonne, blue and yellow (grayed; value between that of rug and walls).
     Ornaments, brass lamp with yellow shade, violet flower in yellow vase, pictures.
2. Analogous Harmonies—
   - (a) Furniture, golden oak.
     Walls, yellow (grayed; light).
     Rug, golden brown.
     Hangings, brown and gold silk rep (value between that of rug and walls).
     Ornaments, brass lamp with yellow shade, brass fern-dish, orange flower in brass vase, pictures.
   - (b) Furniture, golden oak.
     Walls, yellow (grayed; light).
     Rug, yellow-green (grayed; dark).
     Hangings, green and gold silk rep (value between that of rug and walls).
     Ornaments, brass lamp with yellow shade, brass fern-dish, sofa cushions of yellow, yellow-green, green, pictures.
   - (c) Furniture, green wicker.
     Walls, yellow (grayed; light).
     Rug, yellow-green.
     Hangings, green and gold silk rep.
     Ornaments, brass lamp with yellow shade, green fern in brass dish, pictures.
   - (d) Furniture, green wicker.
     Walls, yellow (grayed; light).
     Rug, golden brown (grayed; dark).
     Hangings, green and gold silk rep (value between that of rug and walls).
     Ornaments, brass lamp with yellow shade, violet flower in yellow vase, pictures.

The Dining Room.

The dining room has sets of mahogany and oak furniture including serving-table and china-closet. The color schemes outlined for the living room are used in the dining room also. As these rooms are closely associated because of a collapsible door between them, we harmonize their color schemes.

The Nursery.

The nursery is at the South end of the apartment where there is abundant sunshine. A frieze, about two feet in width, depicting scenes of child-life is low enough to be perfectly visible to children. This room contains a set of child-size furniture in white consisting of bureau, crib, table, chair, and wash-stand. The rug is washable. There is a child's bath-tub, and four properly dressed dolls representing children, one less than a year old, another of two years, and two dolls representing a boy of four years and a girl of the same age. These dolls are used in the lessons on the Care and Feeding of Children mentioned hereafter.

The Bed-Room.

There are two sets of furnishings for the bed-room. One consists of a natural ash bureau, chair, brass bed and wicker shirt-waist box. As this room is not sunny, the walls are papered with yellow which has a brightening effect and increases the illumination under artificial light. Inside of the yellow net curtains are hangings of blue and yellow cretonne, uniting the colors of the floor and walls. A light blue rug is used, the blue in such proportion as to give a pleasing emphasis to the yellow without creating a sense of coldness. Cretonne is desirable for the bed-room as it is cheerful and easily kept clean. The first requirement in this room is the bed; and whether the mattress be hair, wool, cotton or husk, it should be the best of its kind, as one-third of a life is spent on the bed. With the white enamel set of furniture there is a white enamel iron bed, blue, white, green and old rose hangings, blue rug and walls of blue, and purple flowers in a brass vase.

The Pantry.

The pantry affords an opportunity for instruction in the proper use and care of closets and shelves, and the convenient arrangement of dishes.

The Kitchen.

The kitchen is a most important room as the health and comfort of the family depend so largely upon it. It is essentially for the preparation of nourishing food. Our kitchen is furnished with a combined kitchen-cabinet and folding-table near the sink, and a small table near the pantry. There is a fireless-cooker beside the

gas-range. The brown linoleum floor covering is durable and easily cleaned.

The Bath-Room.

The bath-room contains a white enamel medicine chest and the necessary nickel conveniences. The danger of keeping poisons in the medicine chest is made perfectly clear. The floor covering is blue and white linoleum. A blue washable rug is used, and the wall paper is white and also washable.

Outline of the Work.

The course of study in the Model Apartment includes the subjects related to the management of the home. The object is to dignify the housework, to create an intelligent interest in housework, and to cultivate an appreciation of the value of the beautiful in the home.

General Care of the Home.

First, the girls are taught that the proper proportion of the income should be allowed for each of the various fixed expenses, such as, food, shelter, operating expenses, i. e., cleaning, heating, lighting, insuring, etc.; clothing, education, saving, charity and recreation. With relation to buying, the girls are given to understand that they should know what they really need, and know standard qualities and prices, and where they may be found. Concerning orderliness, the rule is, "A place for everything, and everything in its place." With regard to cleanliness it is shown fresh air, pure water and sunshine are the chief factors in preventing disease. Cleaning in such a manner as to raise the minimum of dust is necessary, as the raising of dust means the raising of bacteria.

Sanitation.

The water-carriage system of drainage and the location of the waste-pipes, soil-pipe and house-drain are explained; and the construction and use of a trap and its cleanout are comprehended. A knowledge of the general care of the fixtures and pipes and the proper use of washing soda and disinfectants is made plain. The advantage of open plumbing with joints and traps easily accessible is obvious. It also renders cleanliness and ventilation possible.

Ventilation.

Ventilation, or the changing of the air without a draft, is a vitally important subject; and there is little understanding of it on the part of girls. They are surprised and interested to learn that an adult at rest requires approximately three thousand cubic feet of fresh air per hour; and that a room 10 ft. x 10 ft. x 10 ft., or having one thousand cubic feet of air space, would supply sufficient air for one person for only twenty minutes without ventilation. It is shown that the air can be changed three times in an hour without drafts—but no oftener. Therefore, the above room would be the smallest which could furnish the necessary three thousand cubic feet of air even with proper ventilation. This means that a room occupied by one person should not have less than one thousand feet of air space. The great difficulty is that too many people are compelled to occupy rooms with insufficient air space. The most satisfactory method of ventilation is explained.

The Care of Children.

The training of the girls for efficient motherhood is the specific purpose of this branch of the work in the Model Apartment. The value of regular physical habits in the life of a child is definitely emphasized. For instance, the daily bath is shown to be essential as it aids in the elimination of waste matter thru the pores of the skin, and also acts as a tonic. The baby's bath should

THE BATHROOM.

THE PANTRY.

THE KITCHEN.

be given in the middle of the morning, between feedings. Soap with no free alkali should be used, and the temperature of the water should be blood heat (99 degrees Fahrenheit). The eyes, mouth and nose should be treated with a solutioin of boracic acid, and the scalp should be treated with olive oil if necessary. The clothing for the baby should be loose, soft, warm, light and clean. The old-fashioned pinning-blanket and band are objectionable as the former hinders muscular movement, and the latter weakens the abdominal walls. The baby should sleep for twenty hours during the first few days, the time being gradually decreased as the age of the child increases. It should have ample fresh air during sleep, preferably out-of-doors. The value of exercise at stated intervals is explained. The baby should be allowed free use of its legs and arms, but it should also be guarded from drafts. The importance of feeding is made plain. When substitute feeding is necessary, absolutely pure milk should be obtained. The modifying, pasteurizing and sterilizing of milk are taught, and the care of bottles and nipples is emphasized. The evils of the "soother" are made known.

Home Care of the Sick.

Sickness as a factor in the home must be reckoned with. As it is not always possible to provide for the services of a trained nurse, it is necessary that members of the family should be at least partially qualified to care for the patient—not in the matter of diagnosis which is the physician's work, and dangerous when assumed by others, but in the matter of intelligently carrying out his instructions, and caring for the patient properly. Therefore, the following subjects are briefly considered: symptoms of contagious diseases; symptoms of children's diseases not contagious; care of the sick-room and the patient; changing the bedding and clothing of a helpless patient. Work in First Aid to the Injured is also taken up including treatment of burns, wounds, sprains, fainting, etc.

The Preparation and Service of Meals.

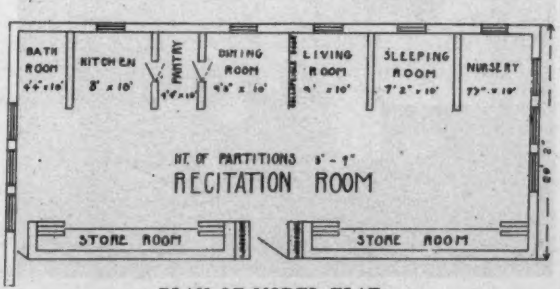
The composition and function of foods is taught, and balanced meals which meet the needs of various types of persons engaged in different occupations are planned. The girls prepare meals and serve them in the correct manner. One girl acts as hostess, thus making clear the duties of courtesy and deportment.

Home Decoration.

It is our aim, in this subject, to give the girls an understanding of color, and sufficient knowledge of the principles involved in correct furnishings to enable them to spend their available money to the best advantage, and to satisfactorily rearrange old furnishings. Failure to express a sense of beauty in home decoration is usually due either to an untrained color sense, or ignorance of the law of appropriateness. There should be unity, harmony, restfulness and cheerfulness in a room. The correct arrangement of colors will produce harmony, and unity will exist if each of the furnishings fills its respective place appropriately. The floor and walls should act as a background for the furnishings and people. Simplicity in ornamentation affords restfulness, while orange and its allied colors add cheerfulness. The tendency of the untrained is to select wall-paper and floor covering ornamented with pronounced figures in conspicuous colors. These make an inappropriate background as they are obtrusive and not economical as they do not combine easily with other decorations. Inexpensive furniture to be durable must be simple in construction. Upholstered furniture is neither durable nor sanitary. Only such pictures as have artistic or moral value should be used. It is preferable to cut a good picture from a magazine and frame it inexpensively than to hang a cheap oil-painting. Inspiration is derived from the pictures of great men and women. Too few pictures are better than too many. General rules for increasing the apparent size or height of rooms are given; and the most desirable colors for different kinds of rooms are taught.

The Theory of Color.

Altho still widely used, Brewster's theory of color with red, yellow and blue as primaries, has been proven scientifically incorrect. The most modern colorists name red, green and violet as the fundamental color sensations, the five standard colors being red, yellow, green, blue and violet. The first work taken up is the memorizing of the five standard colors with their intermediates, as red, red-yellow; yellow, yellow-green; green, green-blue; blue, blue-violet; violet, violet-red. The definitions of the three color qualities, namely, hue, value and chroma are memorized, and the three middle colors studied. By middle colors, is meant the five standard colors midway in the scales of value and chroma (midway between the extremes of color-light and color-



PLAN OF MODEL FLAT.

strength). They are called middle red, middle yellow, middle green, middle blue, and middle violet. By means of the measured color enamels thought out and measured accurately by A. H. Munsell, these middle colors became familiar, and are used as a practical basis for color estimates. With a standard for comparison, guesswork and doubt are dispensed with. Using measured crayons, the students match the middle colors, making the color wheel, and the five standard colors with their intermediates. The three values of each hue, namely, light, middle and dark, are made familiar. These are followed by the three chromes which are called weak, middle, and strong. The balancing of cool and warm colors is considered, and rules for obtaining pleasing color combinations are given. It is made clear thruout the work that quiet color is a mark of good taste; and that refinement in dress and home furnishings is always attractive. Color schemes are worked out with materials, and the rooms in the Model Apartment are furnished.

Conclusion.

Out of a term's work in Home Economics (five months) two months are devoted to work in the Model Apartment. There are five 45-minute periods each week. This term, approximately one thousand students are taking the work in the Model Apartment. The average number in a class is 32. Great interest is manifested by the girls who appreciate the practical usefulness of this course. They are particularly pleased to learn that large expenditures of money do not necessarily mean satisfactory results; and that smaller amounts, wisely invested, may produce gratifying effects. As the girls respond with such eagerness, there is real enjoyment in the work of instruction in the Model Apartment of the Washington Irving High School.

AN EFFICIENCY BLANK

Milton Clauser, Supervisor Manual Training Department, Denver Public Schools

THE following blank report may be interesting to the readers of the Industrial-Arts Magazine.

The report could be filled out by the supervisor as a help to the superintendent in the confirmation of teachers serving on trial time.

It could be used in case of promotions, recommendations, etc.

It might, perhaps, be most valuable as a means of informing manual training teachers as to what may be expected of them; and thus help teachers discover their own strength and weakness.

And, the supervisor who will fill out a blank, or merely carefully read it while in one of his shops, may discover that he has been growing accustomed to some things that were better not overlooked; and consequently it will cause him to help teachers where help is needed.

Report Concerning the Efficiency
of M.....who teaches at the.....School.
....., 1914

I. Work.

A. Tools.
1. Is there a place for every tool and every tool in its place?
2. Are tools sharp?
3. Are tools kept in good repair?
4. *Are tools used in correct ways?*
5. Do pupils know the names of tools and tool operations?
6. Does the teacher show any interest and ingenuity in the construction of demonstrating apparatus?

B. Models.
1. Do pupils' projects show clean tool work?
2. Exactness?
3. Finish?
4. Originality?
5. *Are models well selected?*

C. Drawings.
1. Lettering?
2. Lines?
3. Neatness?
4. Do pupils readily make freehand sketches of objects to be drawn?
5. *Do pupils think before they make lines or afterwards?*
6. Do drawings tell the whole story and no more?
7. Do designs show individual initiative?

II. Pupils.

1. *Do pupils show power?*
2. Progress?
3. Interest?
4. Attention?
5. A good working spirit?
6. Economy,
   (a) In time?
   (b) In lumber?

III. Teacher.

1. Personal appearance?
2. Habits?
3. Dress?
4. *Judgment?*
5. Disposition?
6. Attitude towards (a) pupils?
   (b) fellow teachers?
   (c) principals?
   (d) supervisor?
7. Instruction?
8. Systematic in planning work?
9. Discipline?
10. In making out reports is this teacher
    (a) prompt?
    (b) accurate?
    (c) neat?
11. Responsive to suggestions?
12. Progressive?
13. Does this teacher keep posted on educational progress?
14. Does it show in his work?
15. Does this teacher do any reading or studying outside of his regular school work?
16. *Does he keep in touch with the other school work?*
17. *Does this teacher aim merely to follow the course of study or does he attempt to correlate the formal instructions with real life?*
18. Does this teacher oppose, follow or lead the course of study?
19. Is this teacher strong in one or in all subjects?
20. Would you class this teacher as excellent, good, fair or poor?

Additional Remarks:—

There are *some* who will say this blank is too lengthy, all others might cut it down to the underlined questions.

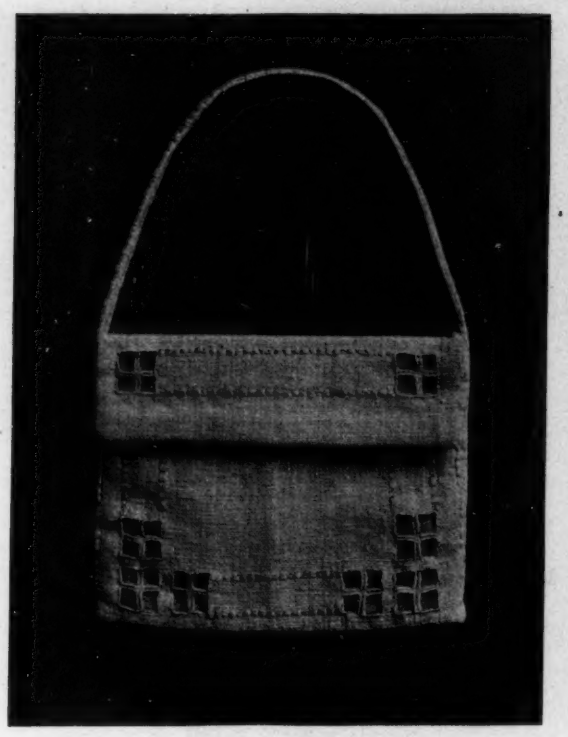


Fig. 1. Linen Bag.

Fig. 4. Gown.

THE STUDY OF DESIGN AND EMBROIDERY

Emma Waldvogel, Pasadena, Cal.

DESIGN and embroidery, studied as a fine art, is one of the most interesting and most useful forms of art which can be taught in our high schools—training the students to think and to interpret and execute their thoughts in a beautiful way. It also gives the students a fundamental basis for their judgment, good or bad, proportion and harmony in all about them; for the study of the best of anything trains us in appreciation of the best in all.

Thus, to obtain worthy results, we must first lay a strong foundation for spacing, proportion, subordination and order, that the students, by learning the principles of design as applied to the simplest forms, may advance to a comprehensive rendering of the most complete design. With this end in view, we find our subject—Design and Embroidery—falling naturally into three divisions, each one a study in itself, design, color and stitches.

Under the division of design, the student must learn to plan from the whole to the part, studying the general spacing, the relation of forms to the background, which is too often allowed to take care of itself, and last, the handling of the smaller details of the forms and motives.

The colors must be chosen and distributed not only with the idea of their beauty together, but also with that of obtaining the clearest interpretation of the design.

The stitches need be but the simple outline, darning, running stitch, etc. They should be chosen and placed so as to give the clearest expression of the design and also the desired effect of color.

In Figure I, we have the breaking of the space by the most simple expression lines and squares. These are successfully rendered by the use of only two colors. The bag is a gray green, lined with an old-gold silk and worked with old gold thread. But two kinds of stitches are used. Notice the effect of the different texture, of the lining and the linen in emphasizing the squares.

Figure II shows a collar, the design of which is worked out by using curved lines, straight lines and triangular spots. The rich oriental colors, Persian red and

---

Note—The work of Miss Waldvogel, illustrated in the above article, has been under my observation for some time. She has had very successful work with classes of public school teachers and the influence of such work has been transmitted by them to the pupils of the schools.

A thoro understanding of design and color, with a complete mastery of technique, renders every problem of extreme value, and from the simple pattern composed of straight lines, to the most elaborate combination of form and color, the absolute sincerity of Miss Waldvogel's work must appeal to every lover of the beautiful and good.

The success of her work here is its own commendation. I know of nothing better in its line.—*George F. Winterburn*, Head of Art Department, Polytechnic High School, Los Angeles, Cal.

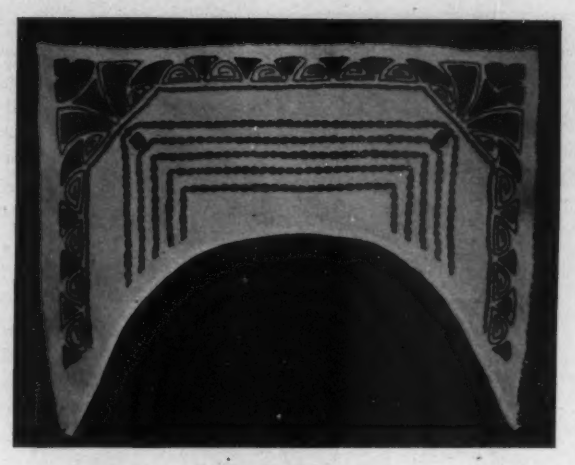


Fig. 2. Collar.

indigo blue, with touches of black, are so distributed as to give accent and strength to the design. Note the simple stitches used.

In Figure III, the two towels, we have a somewhat more complex problem. The design of the top towel is restricted by the vertical, horizontal and right and left obliques. The colors used are blue, black and white.

The selection of the stitches and the distribution of the color brings out a beautiful and pleasing arrangement of dark and light. The interesting simplicity of the narrow border shows again the possibilities of lines, broken with squares.

The design of the lower towel is a study in circles and curves. The colors are the same, blue, black and white, and the only stitches used with the exception of the small solid spots, in the flower head, are the buttonhole outline and darning.

Figure IV is a sample of good spacing, each part of the design being placed just where it is best. The design is very effective, but the test of its simplicity

Fig. 3. Towels.

comes with the ease with which it is put in words—a combination of circles and triangles.

In Figure V, we have an example of good breaking of the space to be handled, and a more complicated but pleasing treatment of the detail of the figures. Note that the circles near the center of the runner are the exact reverse of those at the end in color as well as design. The handling of the design and the color interpretation used both suggest the soft old oriental rugs. The stitches are more varied than in the other figures, but still each is simple.

In a creation of the mind, this study of order, proportion and harmony from the whole to the smallest detail, leads us to make our creations art, which will always be a source of pleasure to others and satisfaction to ourselves. There is no casting off of such a piece because it is "old" or "out of date" for real art is always good.

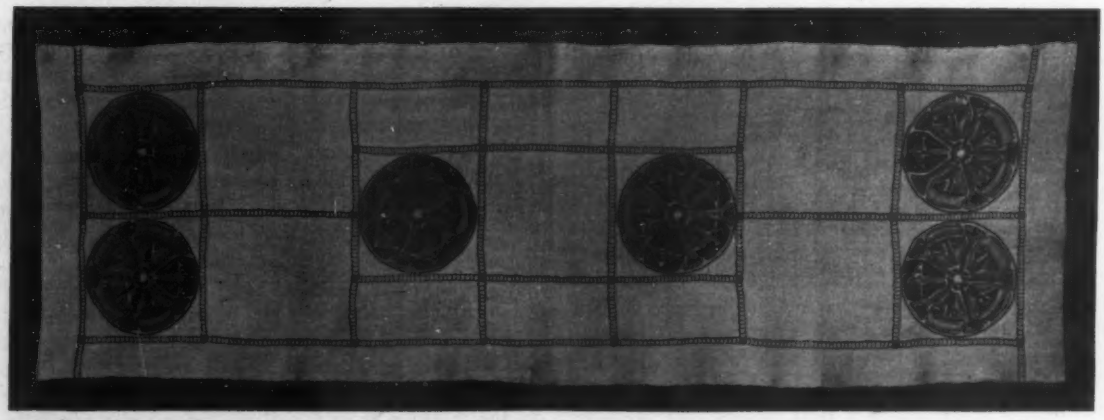


Fig. 5. Table Runner.

Family group of car builders on a Sunday morning. These people do not consult a vocational bureau. The boys become "heater boys" at fourteen.

SOME PROBLEMS OF VOCATIONAL GUIDANCE

Wilson H. Henderson

THE person who reads this article hoping to find therein a solution of the problems of Vocational Guidance, will be disappointed. It is extremely doubtful that anyone knows the solution, or that the problem ever will be solved. Every agency and institution has its limitations and it is the purpose of this article to present some of the limitations and the difficulties met in the administration of Vocational Guidance, in the schools.

The following is not theory. It comes from some years of actual participation in industrial work and as a teacher of industrial subjects, to boys and girls in day school, and to men and women in night school, and from two years of very close contact with conditions in a factory town, in which we have been attempting to advise and "guide" young people vocationally and educationally.

When I worked at the tinners' trade, one hot August, six of us laid a tin roof on a large storage house. We were on that roof eight days and nearly every day some one went to the shade with "bees in his hat." It did not require the advice of an expert vocational counsellor to convince me that if Nature had intended me to continue at that work, she would have provided certain parts of my anatomy with a covering of asbestos. I suspect that an expert would have told me that I should continue at the work. I enjoyed the work in metal, the pattern drafting and the soldering, and my hands would generally do what I wanted them to do.

In a Watch Factory.

In later years as an enthusiastic "Director of Manual Training," I visited one of the largest watch factories in the world. I asked the superintendent if there was not some routine of work thru which they put apprentices in order to teach them the trade. I was somewhat surprised to learn that they do not teach anyone the trade and that there is no order of machines by which workmen are promoted. Nearly every operation in the entire factory is done by an automatic machine which requires only a few motions on the part of the operator For the most part, the machines are "fool proof" and the operator cannot make a mistake.

When I inquired what they did when some one left their service, if they did not promote some one to the idle machine, the answer was, "Certainly not. That would compel us to break in two persons instead of one; one on the machine that the first operator left, and one on the machine from which the second was promoted." I tried to convince that man that it would pay them to shift the operators from one machine to the other in order to vary the monotony, but I found that the opera-

tors do not want to be shifted. They are paid by the piece and if they are shifted, they cannot turn out so much work on the new machine, and the pay is therefore less. Then I was told that most of the operators are girls who are not interested in learning a trade; they expect to be married in four or five years and it is not worth while for them to spend time at low wages learning a trade.

In a Telephone Factory.

Last week I went thru one of the largest telephone factories in the world. Twelve thousand people are employed in that establishment; eight thousand men and boys, and four thousand girls. I found that telephones are made by a process of the same character. By the use of jigs, templates, and automatic machinery, the manufacture of telephones and switchboards has been reduced to almost an unskilled occupation. The corporation which operates this factory employs 26,000 people, 7,000 of whom are in their offices. Of the entire force, 800 are graduates of colleges.

Each year this corporation sends men to the principal technical schools to find capable college graduates to enter their employ. These graduates are given a one year's course of training and are paid $65 a month while they are learning. At the end of the year if they prove satisfactory to the company and are satisfied, they are employed at $18 a week and are sent out to various departments. For two more years these men are under the supervision of the Educational Department of the company and care is taken that the men are placed at the work for which they are best suited, and they are so placed that their full capacity and talents can be used.

This is Vocational Guidance of the highest type, but note that only 400 of the 26,000 employes have had this "Apprentice Course" and this guidance. In the factories where the 19,000 work, there is an inspector for every five workmen, and the workmen are paid, "by the piece."

The Pickling Works.

There is a large canning and pickling factory with which I am quite familiar. In this factory, 500 girls are employed. A number of them sit at a table sorting pickles according to size. Pickles, pickles—nine and a half hours a day, five and one-half days a week, 52 weeks in a year. Another group pack stuffed olives in bottles. They pick up the olives with a device which looks very much like a long clothes pin, and place them just so, with the red side out, in long bottles. They are paid by the number of bottles which they pack. Other girls wash the bottles, paste the labels on them, wrap them and place them in boxes. These girls work in gangs, six or eight girls in a gang. They sit at a table in the middle of which, is a moving belt. The first girl washes the bottle and puts it on the belt, the next puts the paste on the label, the next puts the label on the bottle, the next puts the paste on the edge of the wrapper, the next puts the wrapper on the bottle, the next inspects the job, and the last one places the wrapped bottles in the case. The gang is paid by the number of cases they pack in a day, so each girl rushes every other girl in the gang. Instead of one boss, each girl has six or seven. If one girl is slow, the others complain to the superintendent.

Now this kind of work must be done. We have to have olives and pickles, and they have to be sorted, and bottled and packed for shipment. Perhaps there are psychological tests which will determine which girls should sort pickles nine and a half hours a day. I have no doubt that Dr. Blackford can tell which girls *can* sort pickles expertly, but I have failed to find any tests which will show which girls *should* do so, nor which ones will find their happiness in this *vocation* (?).

Car Shops.

In the large shops where steel cars are made, boys from 14 to 16 years of age are employed as "heater boys." These boys stand all day directly in front of a furnace in which rivets are being heated. When the rivets become white hot, they take them out, using a pair of tongs, toss them to a "fitter" who puts them in place where a "bucker" holds them for a "riveter." The pay for this work is from twelve to fifteen dollars a week. I noticed a number of boys in night school who could not see well, and I found on inquiring, that they were "heater boys." Looking all day into the fiery furnace affects their sight. Goggles made of glass will be broken, and celluloid ones would be ignited, by the heat. But then, they are paid such good wages because of the discomfort and the loss of sight.

Steel Mills.

I often visit a city in which there are large steel mills. Sixteen thousand men work in those mills. One-half of the number work from 7:00 A. M. to 5:00 P. M. and the other half from 5:00 P. M. to 7:00 A. M. One shift works ten hours and the other fourteen, and the shifts are changed each week, i. e., the shift that works days this week works nights next week. The great majority of the men do not have to think. All they do is to care for some automatic machine or do manual labor. The men who fill the cars which take the ore to the blast furnace do not know what they are shoveling into it.

This force of 16,000 men must be recruited. The large hospital, just outside of the gate to the plant, is a grim reminder that working in the steel mills is a hazardous occupation, and that men "drop out" quite frequently.

The Automobile Industry.

The following is quoted from a description of the manufacture of automobiles in the Ford works in Detroit, in The Survey of February 7, 1914. "Fifteen thousand men work in gangs on the track system. Each gang, and each man in each gang, has just one small thing to do—and to do over and over again. It's push and hustle and go. The man behind may shove his work along to you at any moment—you must not hold him back; at any moment the man in front may be ready for another piece to work on—he must not be kept waiting.

"Up one line and down another goes a continual stream of motor parts in process of assembling. One man fits the parts together so that the bolt holes come

right. The next man slips the bolts into place. The next has a pan of nuts before him and all day long he scoops them up and with his fingers starts them on the thread of the bolts. The next man has a wrench and he gives them the final twist that makes them tight."

The building trades are rapidly adopting a system of division of labor. In the carpenters' trade, one man does nothing but shingle, another does lathing, another builds stairs, another does the framing, while a boy does all of the sawing. Window and door casing is made at the mill. Spouts and gutters are sent to the job direct from the factory. It is possible to buy the material for a fireplace with each part numbered and cut to fit. Stonework comes from the quarry all ready to be set in place.

It is unneccessary to continue this description of conditions in the industries. Every investigator finds similar conditions to exist in textile mills, book binderies, shirt and overall factories, packing houses, furniture factories, candy factories, and numerous industries. Operators work for years at one machine doing work which requires no thought and very little manual dexterity. Everything is reduced to a system of which Speed is the motto.

A Skilled Occupation.

The following has recently been given as the definition of a skilled occupation: A skilled occupation is one which meets these three conditions: (1) provision of a living wage for the worker; (2) a content which offers the possibility of differences in the quality of the work turned out; (3) provision for promotion, by constituting one of a series of progressive steps in the industry leading to something better. According to that definition, fully 80% of the persons employed in factory production, are in unskilled occupations.

We cannot expect these conditions in industry to change materially in regard to the character of the employment of the operatives, in the immediate future. Automatic machines do their work economically. Manufacturers will not install machines requiring the services of a trained operator, if one can be obtained which may be operated by a novice. Industries will not adopt a plan whereby they will require expensive skilled help, just for the purpose of promoting industrial education.

Industries are conducted for one purpose, the making of profits. They are not philanthropic institutions. Manufacturing is a competitive game. The large publishing plant in Hammond competes with the printing establishments in all parts of the country, and if it can install a machine which will do the work more economically than those in the plants in Chicago, it will do it. Furthermore, Congress is just now endeavoring to pass laws which will insure the continuance of this competition.

Theory of Vocational Guidance.

The theory of Vocational Guidance might be expressed in the words of Prof. Parsons, in "Choosing a Vocation." "If a young man chooses his vocation so that his best abilities and enthusiasms will be united with his daily work, he has laid the foundations of success and happiness. But if his best abilities and enthusiasms are separated from his daily work, or do not find in it fair scope and opportunity for exercise and development; if his occupation is merely a means of making a living, and the work he loves to do is sidetracked into the evening hours, or pushed out of his life altogether, he will be only a fraction of the man he ought to be."

Dean Schneider of the University of Cincinnati, in a recent address, said: "A man is most efficient when his work gives him the greatest satisfaction; when he is doing the thing his Creator intended he should do. Every working man, from the hewer of wood and the drawer of water, to the research scientist, should get three things out of his work: First, mental and physical development and discipline; second, joy in doing it (or at least satisfaction.); and third, a decent living. And the man who has found the job his soul is blindly craving, the job for which he has inborn talents, gets these. But the man whose whole being revolts at his task becomes a captious citizen, an inefficient worker and a meager earner."

Vocational Guidance may therefore be defined as leading persons to choose vocations for which they have inborn talents and in which their best abilities and enthusiasms will be united with their daily work.

Employment Office of a Car Shop.

Class in a pre-vocational school. These are the fellows who need vocational education and guidance.

Dr. Munsterberg, in his book, Vocation and Learning, says: "The ideal fulfillment of the economic work of the nation ought to be the inspiration for everyone who does a useful service, even in the humblest position. . . . . The toiler's attention may be absorbed by the unpleasant drudgery of his labor or by the pleasant gain at the week's end, but in his deepest mind he ought never to forget that he is helping along that wonderful work of economic achievement which gives worthy meaning to his industrious days. . . . . Paths of ideal achievement are open before everyone, poor or rich, well versed in high studies or trained by humble education, in the metropolis and on the farm, boy or girl. And whoever feels the need of the ideal fulfillment will gain enduring happiness in his vocation, whether he be the director of the company or the office boy, whether she be the college president or a kitchen girl."

In these quotations we have the formulae for attaining success, happiness, and efficiency, in a vocation.

Now take a trip thru the great packing houses at the stock yards in Chicago. Try to describe men whose best abilities and enthusiasms are united with sticking pigs and killing cows and sheep, nine hours a day, six days a week. Imagine paths of ideal achievement opened by such work. Remember that there are 90,000 men employed in slaughtering and meat packing in the United States, besides those in retail establishments.

Plan a course of instruction for the schools which will lead the girls who stuff olives in bottles and who sort pickles nine and a half hours a day, "to see and feel that thru their work and by the mastery of their occupation or craft, they are rendering the world a service as truly as is the statesman, the minister, or the reformer. And that if they make their work good enough, they may, thru it, serve future generations, the same as any artist or creative genius." Your course should also swindle them into believing that the world appreciates this great service they are rendering, and as proof, show them the generous reward it gives them in their pay checks, which are five dollars a week.

We speak of the work which the Creator intended that a man should do and proceed on the theory that Nature fits every person to do certain work. We forget that perhaps the Creator did not intend conditions in the industries to be just as they are, nor that the remuneration should be incommensurate with the labor. It has not been proven that the Creator intended that a person should work at high speed for ten hours a day, and that one man should receive ten dollars a day and another only one.

The fact that a boy likes to work with telephones and electrical apparatus, does not justify the conclusion that he will enjoy the work or conditions, or pay of a telephone factory. My own liking for work in sheet metal did not make me enjoy working on a hot tin roof.

I fear that we are endeavoring, thru a process of education, to make the other fellow enjoy the work which is distasteful to us. The idea is being advanced that if we will give a person a knowledge of his vocation that this knowledge will make the work more agreeable to the worker; that if the worker knows the source of the material with which he is working and the use which will be made of the finished product, this knowledge will enable him to enjoy his work. It is strange that we always apply this theory to those vocations which we, ourselves, do not enjoy, and always to the other fellow.

Some Conclusions.

Experience, observation and study have brought me to the following conclusions, which I wish to submit as essential considerations in the establishment of agencies for vocational guidance:

(1) Vocational Guidance is needed most by those persons who go at an early age, into so-called "blind alley" occupations.

(2) To accomplish its purpose, Vocational Guidance must serve as "preventive medicine" to dissuade children from leaving school at or about the age of 14, and entering unskilled industries; therefore this guidance must be given in the elementary school. The establishment of Vocational Guidance departments in high schools and colleges does not entail many serious difficulties, but these do not solve the problem of vocational guidance which is most acute in the elementary school. The making of a vocational and educational survey is a comparatively simple matter. The most difficult problem is to devise ways and means of giving the results of these surveys to parents who send their children to work at the age of 14 or allow them to go. They do not read the reports of surveys nor voluntarily consult a vocational bureau.

The fact that several surveys and investigations have demonstrated that 70 per cent of those who leave school between the ages of 14 and 16, do not leave on account of economic necessity, does not modify the fact that 30 per cent do leave on account of economic pressure. Thirty per cent of those who leave school between the ages of 14 and 16 is 15 per cent of all who enter the schools and is three times as many as the number who graduate from high school. So that this number is by no means inconsiderable.

For these persons the school must offer opportunities for vocational training in order that they may be able to do something well and thereby be enabled to earn enough to supply their physical needs. The question with them is not so much which vocation shall they choose in order to be happy, but where can they find a job in which they can earn a decent living.

If the school will give marketable skill in any legitimate line of work, its students may shape their own destinies. Many a young man has worked his way thru college by his skill as a barber. Hundreds of young persons are paying their way thru universities by doing stenographic work. The skill or trade taught by the school need not be the ultimate goal, but may be the stepping stone to higher things.

(3) Vocational Guidance must consist of something very much more tangible than mere talk or advice.

(4) It is impossible to make offensive employment pleasant by a process of educating the worker. As

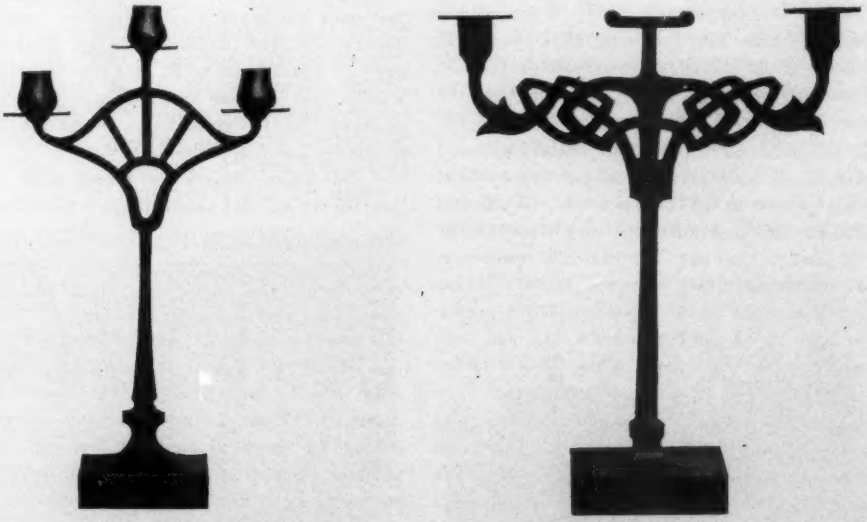
the tastes and impulses of the worker are refined and quickened, the more offensive will the work become. The worker may tolerate the work but he will not enjoy it. It is possible, in time, to so deaden the sensibilities of a person, that he will not actively resent the work, but this is not an educative process. This proposition is perhaps heretical, but apply it to yourself. Has your education so modified your dislikes that you could enjoy cleaning sewers as a life work? Yet you know that this work is necessary to the health of the community. Would you be content, with your education, to spend the remainder of your life operating a machine which requires one or two motions of the hand, even if the salary were more than you are now receiving? Do you think that further education might lead you to enjoy this kind of work?

(5) It is extremely doubtful if everyone can or will find congenial employment. It is doubtful if such work as sorting pickles, working on tin roofs, and in cotton and steel mills, and packing houses, ever will become such that a person can find the fulfillment of his ideals in them, and thus gain happiness in his vocation. It is certainly not desirable to train men whose souls blindly crave such work. At the same time it is very probable that large numbers of people will earn their living at such work.

The tests made by vocational analysists may be entirely reliable and they may be able to determine the work for which a man is fitted, but it is impossible to believe that Nature will ever create just the right kind of persons in just the right numbers to fit into the changing conditions of industry.

In recent years there has come an element into industry which is making great changes. It is called scientific management. We read that certain large manufactories have reduced their shop force by 30 per cent and at the same time increased output 300 per cent. At the present time sufficient goods are being produced to satisfy the needs of the world and all of the labor of the world is not employed. Economists tell us that 10 per cent of the present laborers are idle. Now we are told that scientific management is making 70 per cent of the laborers do three times as much as all of the laborers did before. Allowing that the statements are exaggerated, still we find that fewer men can produce enough goods for the world's needs. That means either unemployment for more laborers or shorter hours for all laborers. If all of the laborers are to work full time and the productive rate of each laborer increased, over-production will inevitably result. A higher standard of living will increase consumption; vocational education will also increase production. Then we are told that women are to be economic producers which will also increase production.

Shorter working days must come and with them will come more leisure for the laborer. This will give the persons who work in uncongenial employment an opportunity to satisfy their need of ideal fulfillment in their leisure hours, and thus gain happiness. Thus with vocational training, and scientific management, and the economic independence of women, must come education for leisure, or we might call it Avocational Education.



Candelabra Forged by Mr. Thomas F. Googerty, Pontiac, Ill.

Fireplace in Bungalow built by Manual Training Class.

MANUAL TRAINING BOYS BUILD BUNGALOW

Edwin C. Best, Seattle, Wash.

MR. FRANK E. BEST, Head of the Manual Arts Department, Franklin High School, Seattle, Wash., with a squad of boys, selected from the Department, erected a bungalow during the Summer vacation of 1913, to test the practicability and adaptability of building construction for Summer courses.

The idea originated with Mr. Ben. W. Johnson, director of Manual Training of the Public Schools of Seattle, who desired to have the experiment tried out.

The matter was brought before the School Board, but the members declined to finance the project. The question not only of obtaining material with which to build a bungalow, but of a site upon which to build it, and also the matter of disposing of it after it should have been built, had to be met.

Shortly before school closed in June, Mr. Best called upon several public-spirited persons with a view of having them finance the project, but not succeeding with them, arrangements were finally made with Miss Minnie C. Johnson, one of the teachers in the same school, and a contract was drawn up and all legal precautions taken before beginning the work.

Then followed the selection of the boys, who were to take part in the work. Eight boys, ranging from 14 to 17 years of age were selected with special reference to their fitness for the work in hand. There was no trouble in securing them, since in addition to the training obtained, they were to receive school credit and $1.25 per day, which was finally raised to $1.50 per day of eight hours. Many more of the boys would have gladly joined in the work.

The boys drew the plans and prepared the specification, bills of material, etc. After all details had been arranged, work was begun about one week after school was out in June. The premises purchased by Miss Johnson were situated near the school building, overlooking beautiful Lake Washington.

At the appointed time, the boys came armed with picks and shovels, full of enthusiasm, and reported ready for work. The premises were first properly surveyed with improvised instruments, but which were accurate and satisfactory. The instrument used for leveling the work was a glass tube in the shape of the letter "U" which was filled with water colored with aniline dye. The upper part of the tubes were about 2½ feet apart. The surface of the colored liquid in the tubes formed the sights.

The work had been carefully mapped out for each day from the start to finish, and the boys were as enthusiastic to see this program carried out each day as tho it had been a baseball game or a boat-race; and not even the hard work, which was so different from what they had been accustomed to, was sufficient to dishearten them.

The work was begun Thursday afternoon, June 26. The first half day they made the earth fly in good shape, but when they reported for duty next morning several of them could show blisters on their hands. Yet nothing daunted, they were ready for their tasks. Their instructor, who was their "boss" showed consideration by frequently changing their task, or by allowing ample time in which to rest and recuperate when exhausted.

The earth was excavated by hand as this was considered to be less expensive, as well as making a much neater job, and was finished within a day and a half.

The forms for the concrete walls were made and everything put in condition for pouring by Saturday

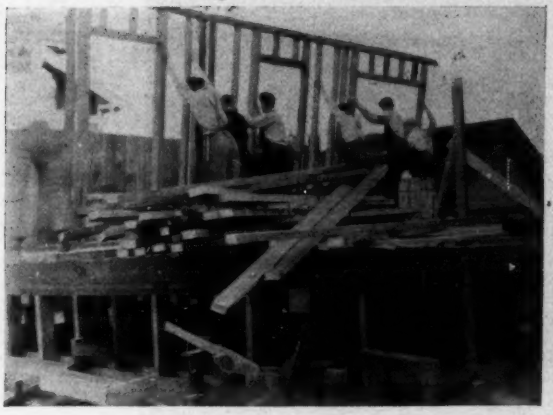


Fig. 1. Raising Frame.

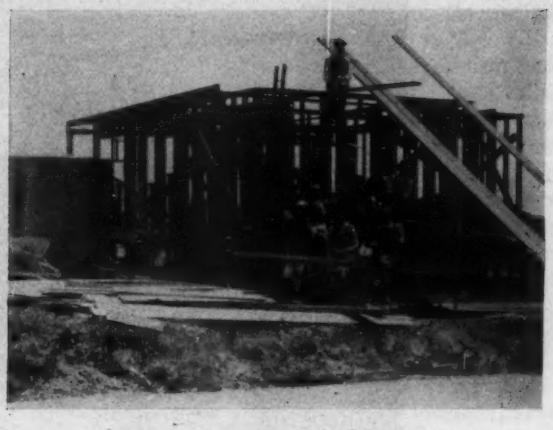


Fig. 2. Framework Partly Completed.

night. On the Monday following, the concrete was mixed and poured. This, tho heavy work for the boys, was well and quickly done.

In putting up the superstructure, the boys worked from detailed drawings. From these drawings they obtained the dimensions of each piece and laid out their work, which was checked up by the instructor.

Fig. I. shows the boys in the act of raising a section of the frame.

Fig. II. shows the sections forming the lower story in place. The long timbers lying against the building in an inclined position are floor joists, which they are preparing to lay in place. This shows the work as it appeared after about one-week's work.

Fig. III. shows the work as it appeared after two and one-half weeks. This shows the sides of the building covered with ship-lap sheathing, with the rafters nearly all in place.

Fig. IV. shows several of the boys hard at work. The boy with the hod tells the story that the work of constructing the chimney is well under way. The chimney and fireplace were built by the boys, altho they received some very helpful suggestions from an experienced bricklayer, who volunteered to give them some pointers, and who gave them instructions as to mixing the mortar, the use of the line, and various other things.

Fig. V. shows the chimney when nearly completed. The fireplace was made of glazed brick laid in dark colored mortar.

Fig. VI. shows the boys engaged in plumbing, which work was entirely done by them, including the setting of the bath tub and other fixtures. The calking of joints was so well done that after the water had stood in the pipes a week, it had only lowered three inches, or about what might naturally be expected from evaporation, the joints being entirely dry. All this work as well as the mason work and electric wiring, was done by the boys in conformity to the requirements of the city ordinances governing such work and were passed upon by the city inspectors.

Fig. VII. shows the building as it appeared when it was about ready for lathing and plastering.

After the boys had plastered three rooms it became evident that the work was rather too hard for them. It was also apparent that they were falling a little behind their schedule time, so plasterers were employed to finish

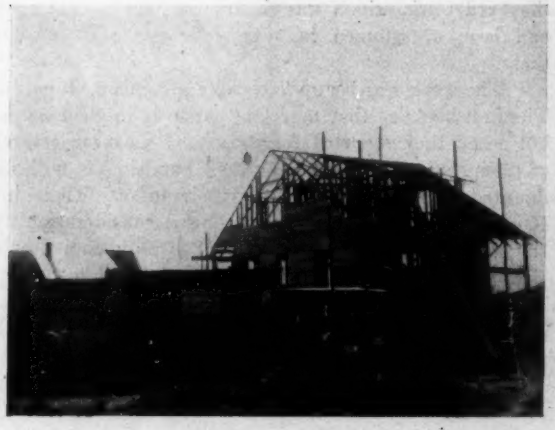


Fig. 3. Completing the Sheathing.

Fig. 4. Hard at Work.

Fig. 6. Roughing in Plumbing.

Fig. 5. Completing the Chimney.

Fig. 7. Nearly Completed.

the job. The boys, however, mixed the mortar and carried the hods.

The door frames and window frames were received from a planing mill in "knock down" form; that is, every piece was made a trifle longer than required to allow for fitting—which was done as the work required. All other mill work was done in the ordinary manner.

The dining room floor in quartered oak was laid by an expert.

Fig. VIII. shows one of the boys in the act of painting, which was done by several of the boys with paint ready mixed. In this work as in all other lines, the boys were selected with a view to their fitness, and when any boy showed ability in any branch of the work, he was generally kept at the job, altho no boys were kept at any one job thruout the entire time, but all were given a chance at various jobs to show their capabilities.

Fig. IX. shows the kitchen after being painted, in white enamel. The wood first received two coats of "flat white," after which it was rubbed down and a coat of white enamel applied, all nail holes and defective places having been properly puttied. This finish gave the kitchen and particularly the cupboard, which was made by the boys, a very neat appearance and contrasted beautifully with the linoleum which covered the floor.

Fig. X. shows the house in its finished condition. The boys graded and laid the cement walks and basement floor. They also graded and seeded the lawn.

The photograph at the opening of this article shows the fireplace and "built-in" bookcase. The steps seen are hinged and form a neatly covered woodbox as an adjunct to the fireplace.

There were two "built-in" dressers in the bed rooms, off from which were ample sleeping porches, closets and trunk rooms.

The results of the summer's work in fitting the boys for general usefulness can hardly be overestimated. The experiment was a success financially, and the construction was done as well as would have been done by average workmen, giving entire satisfaction to its owner.

Fig. 8. Painting.

Fig. 9. A Peep into the Kitchen.

Fig. 10. The Completed House.

LANE TECHNICAL EVENING SCHOOL

W. J. McLaughlin

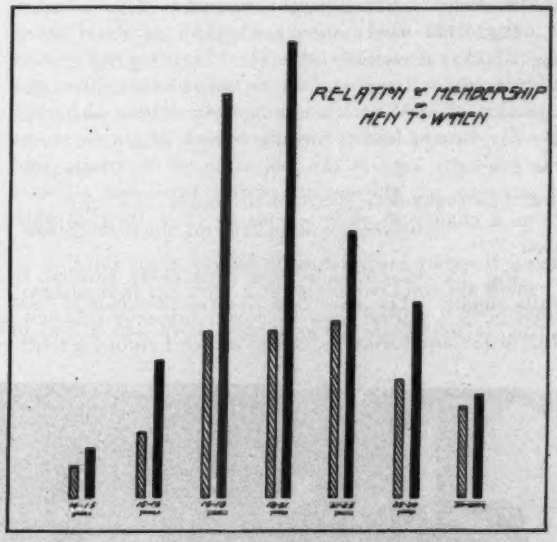
THE Lane Technical Evening School of Chicago closed its doors in March, after completing the most successful year of its existence. Starting out six years ago with a modest attendance, this school has gradually increased its facilities and in number of pupils until it has acquired the name of the largest school of its kind in the world. It spells opportunity for all. Within its walls may be heard the humming of the sewing machine, pitting its feeble voice against the more gutteral tones of the clanging forge; the snappy ticking of a hundred typewriters, voicing themselves in unison in their attempt to be heard over the angry spitting of gas engines; the hissing of molten metal, mingling with strange whisperings from the dressmaking department—all setting up a cry which eloquently announces opportunity to those who heed its message.

On March 11, the school discharged 3,767 men and women into the business world with five more months of education at their finger tips, and with it the ambition and ability to better their present conditions. Some figures taken from the annual report may prove of interest to those not familiar with the institution. In the total enrollment of 3,767, the number of men represented is 2,506, the number of women 1,261; 1,332 of the students are between 14 and 18 years of age. Among nationalities represented, American born people come first with a membership of 2,859, with Germans, Swedes, Italians, Irish, Austrians, and English following in the order named. It requires 62 men teachers and 28 women teachers to take care of these students, some of whom are teachers during the day, while others are employed in various pursuits, from chemists, office men, etc., to blacksmiths, foundry men, etc.

The classes are held from 5:30 P. M. to 9:30 P. M. four evenings a week from the beginning of October to the middle of March. The curriculum includes English, French, Spanish, German, physics, chemistry, stenography, typewriting, bookkeeping, mathematics, carpentry, joinery, cabinet-making, wood-turning, foundry, blacksmithing, electric wiring, electrical construction, machine shop, free-hand, architectural, and sheet metal drawing, machine design, structural steel and reinforced concrete work, commercial correspondence, millinery, dressmaking, and agriculture.

The evening school was organized primarily for the purpose of helping those people who found themselves handicapped by lack of sufficient knowledge on any one subject; for those who in mature years discovered that lost or deprived opportunities of youth rose up like a gigantic wall between them and success. It is for these people that the night school was originally intended, in order that they might have a chance to gain a solid footing, and be enabled to fall in step with the march of progress. But, finding that there was an ever increasing demand for a broader scope of subjects, the school gradually adjusted itself to meet these demands until now practically every subject is taught. It is not even necessary for those who complete the day-school course to sever their connections with the public schools. College courses are offered in graphic statics, structural steel, physics, chemistry, mathematics, and shop work—practically all the fundamentals required before specialization in a university. The introduction of this course has rounded out the list of subjects taught and established beyond doubt that the school is in reality a "people's college."

One of the greatest benefits to be derived from a school of this sort is the opportunity which it offers to the trades. While no pretense is made by the faculty of teaching a trade, owing to the shortness of time spent in the school shops, yet the courses go far to broaden a mechanic's knowledge of his chosen work and to make him capable of grasping with a greater degree of intelligence, new problems which may confront him. Especially to the machinist does this apply. It is well known that the machinist's trade is one of the hardest to learn. This is true because a man starting out with the intention of becoming a machinist is set to work on a lathe—say making spindles. He is kept at this job so long that



Graph Showing Ages and Relation of Sexes in Lane Evening School Enrollment.

he has from constant practice become wonderfully skilled in the turning out of these spindles. And there he is likely to stay—making spindles. He has become to the firm, a human machine automatically turning out a product mechanically correct. It would be folly, from the employer's point of view, to put him at another machine where his efficiency to the firm would be materially lessened. And what is the alternative for the man?

Class in Forging.

Either to apply somewhere else for a job on a different machine, or to continue making spindles until like a machine he has become worn out and is sent to the "scrap heap." But with the coming of evening schools he is able to pick up in a new way a knowledge of the various machines adapted to his trade, giving him a short cut to the completion of his apprenticeship, and eliminating most of that slow and unlucrative process of jumping from shop to shop in his endeavor to learn his trade.

But it is not only the machinist of whom this evening school takes care, but men of various trades. The carpenter contractor is found working in the electrical shop studying the methods of wiring a building. The pattern-maker is busy in the drawing room working out ideas he has gleaned from long association with plans and tools; and so on down the line. Founders, printers, electricians, etc., all are found working out some peculiar phase of their trade which they could find access to in no other way. Even men interested in agriculture, who are far-sighted enough to see the ever-budding chances in scientific farming, have grasped the opportunity to study the construction and arrangement of farm houses and machinery; to learn the methods of grafting fruit trees, of soil innoculation, etc.; and to get a working knowledge of just what systematic farming means and is.

For those not mechanically inclined courses in commercial branches—stenography, bookkeeping, typewriting, and commercial correspondence have been introduced. There is an ever increasing demand for a general understanding of these subjects in the business world, and a specific knowledge of any one of them means much to those in business. The class in commercial correspondence is especially fortunate in having at its head a man who for years has handled the correspondence of the largest retail firm in the city. Some there are who prefer to take a course which follows very closely along the lines of the day-school curriculum. French, German, Spanish, physics, chemistry, four years of English, drawing, shop, etc., are offered to these pupils; and, if the subjects are successfully carried for four years, the student receives a diploma somewhat similar to the one given to the day-school pupils.

One of the largest and most successful courses in the school during its present term was the joint department of millinery and dressmaking. With a class so large that for a time it was found necessary to limit each pupil to two nights a week, the seventeen teachers in charge—seemingly unhandicapped—taught the girls how to make patterns for dresses and frames for hats; how to economize in choosing materials, etc.; as well as how to finish off the finest garment. When these 3,767 people held their exhibit of the year they virtually gave the school—by the variety of their products on display—the appearance of a mail-order house in full operation with everything and anything mentionable from a "copper's club" or a marine engine, to the latest chic hats and party dresses. A feature of this exhibit which deserves special mention was the "dressmakers' convention" which was held in the assembly hall of the school. Here, the girls passed thru the audience cabaret fashion, and promenaded on the platform, while an instructor pointed out the different effects of the draped and circular tunics, and the popular bouffant and peg-top skirts. The waists, with their kimona and raglan sleeves, and loose drooping effects were displayed to wondrous advantage in the charming color schemes of their youthful designers. The hats came in for their share of the applause, while the humble house-dresses were present in all their modesty of style. The interest shown in this phase of the exhibit was so great that it was found neces-

Photo Courtesy Chicago Daily News.

Drawing a Heat.

sary to repeat the program to satisfy the demands of the numerous friends and relatives of the proud "models."

Another feature of the closing exercises of the Lane Evening School which had a prominent place on the program was the graduation of twenty-two pupils who had completed a four year course at the school. The school offers the following four courses:

Commercial Courses.

Stenography and Typewriting	16 Cred.
Business English	8 Cred.
Electives	8 Cred.
Total	32 Cred.

Bookkeeping and Penmanship	16 Cred.
Business English	4 Cred.
Business Arithmetic	4 Cred.
Elective	8 Cred.
Total	32 Cred.

Academic Course.

English	8 Cred.
Foreign Language	8 Cred.
Mathematics	4 Cred.
History or Science	4 Cred.
Elective	8 Cred.
Total	32 Cred.

Technical Course.

Shop, Science or Drawing	16 Cred.
Shop Mathematics	4 Cred.
Practical English	4 Cred.
Elective	8 Cred.
Total	32 Cred.

Trade Course for Women.

Dressmaking or Millinery	16 Cred.
Drawing	4 Cred.
English	4 Cred.
Elective	8 Cred.
Total	32 Cred.

The number of credits required for graduation is 32. It is not necessary, however, for the pupil to earn all his credits in the school. If he is engaged during the day in any pursuit which has a particular bearing on one of the subjects he is taking, an investigation is made of his practical knowledge of the subject, and he is given credit equivalent to his knowledge. While these diplomas are not given the same recognition as those received from the day school, yet they mean much to the business man. A diploma of this character tells a story of conscientious effort and dogged determination—assets greatly desired by the employer in his employees. It was the first graduation of its kind ever held in Chicago and was not without a strain of pathos as one watched a man well along in years with blue shirt and dust-begrimmed shoes, and probably tear-moistened eyes, proudly display yet jealously guard the piece of parchment which had been denied him in his youth.

It was the one gala night of this industrious group of people, and many were the praiseworthy phrases dropped from the lips of the interested audience as they grouped themselves in awe about whirling motors or fiery crankshafts. It was the one night when visitors gained some idea of the real worth of the Lane Evening School and saw for themselves how all nationalities, from the blond haired giants of the North to the swarthy men of the South, are found rubbing elbows in their quest for knowledge in this educational melting-pot of Chicago.

Evening Students Wearing Dresses Designed and Made by Themselves.

The Author's Class in Non-Equipment Bookbinding.

NON-EQUIPMENT BOOKBINDING

Nancy Beyer

BOOKBINDING is becoming a necessary training in public school systems and industrial school courses. With the former, it is necessary as a means of preserving and repairing of books; with the latter, as a part of an industrial educational system.

To read any good "History of Bookbinding" is to know that binding is divided into two branches, "commercial binding and fine binding"; but the *new era* in bookbinding gives commercial binding, fine binding and non-equipment binding.

Commercial binding is equipment work, fine binding is part equipment and part handwork; non-equipment binding explains itself. It is the last I will dwell upon.

The city schools, like New York and Chicago, are taking the lead in this new movement. There is one difficulty the school boards are meeting with, and that is to find teachers who are fitted to teach the subject. Why did the New York Board of Education recently publish a circular on Eligibility for Examinations, specifying such requirements as these, "(women only), six years of shop practice and two years of teaching experience," when the fact is known that in no commercial bindery can a woman follow the trade and do all of the various steps involved in the binding of a book? Where then are the trained teachers to be found? They are not to be picked from the shop without having an all-around training, but will be selected from the best normal training schools.

Then what will be the requirements in training? A course of two parts: First, a thoro knowledge of the use of equipments and the technical points in binding which will eventually lead to commercial work — office or bindery.

Second, a thoro knowledge of how to do the work without the aid of equipments—hands trained to be useful in the home, school or library.

Now for the training of the boy or girl, whether in a high school or industrial school. If it is to be a commercial course in a high school, for all "progressive high schools" have their commercial courses, the student in non-equipment work is taught pasting, mounting, repairing, making of portfolios, envelopes, notebooks, etc. School boards need not say then for lack of funds "we cannot have this in our regular curriculum," but rather repeat the words of an up-to-date superintendent in one of the Eastern Pennsylvania towns:

"I am still of the same opinion concerning bookbinding in the public schools. From year to year, as a better understanding of what industrial education really is, settles upon, and into the schoolroom, more and more will we come to realize the possibilities of its efficiency. One of the forms this industrial education will take is sure to be bookbinding.

"First, because it is easily taught in the schools.

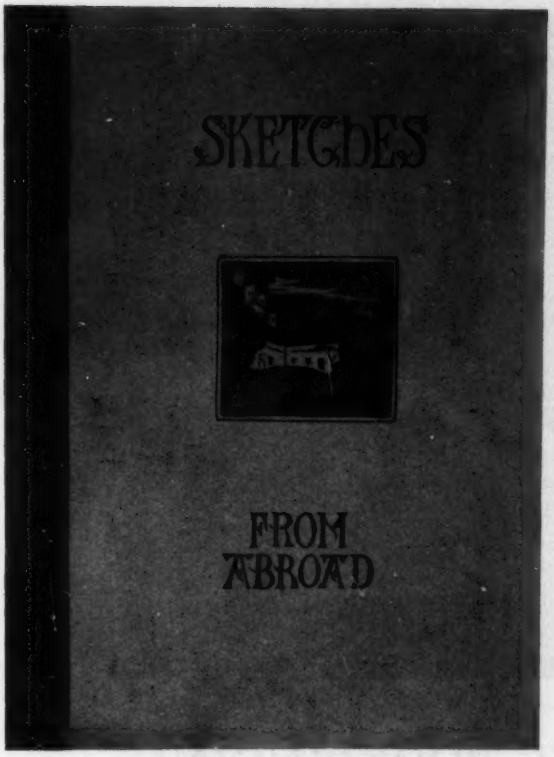


Fig. 2. An Example of Book Bound with Japanese Sewing.

"Second, because there is plenty of opportunity in the schools.

"Third, because it will more than pay for itself.

"A course of bookbinding in any school system should include the rebinding of all texts as the covers wear out.

"Any system of industrial education that pays for itself will be welcomed by school boards in general.—*H. W. Dodd.*"

In the February issue of this magazine, under "Trade Training in Public Schools," the statement is made that "the technique and handskill of a trade must be taught where the trade is being practiced." If this is true, then the public school should have its own bindery, bind its own school books and rebind and repair its own books.

If a course in bookbinding is not given in the schools, where can the boy or girl learn the trade? Only by becoming an apprentice—and our boys and girls of today are graduating from schools to become—not apprentices, but professionals, lacking experience of course, but fitted to fill positions which they have rightfully earned.

Much poor binding comes out of the commercial bindery because of untrained workmen. But there has been a vast improvement in binding in the last ten years. The use of tape in sewing up books has been adopted extensively for school books. This was borrowed from our foreign neighbors. But we can boast of non-equipment work as a purely American idea.

The quickest and best way of doing whatever needs to be done is a good axiom on which to base non-equipment binding. The binding selected to be done is one useful in school, home, library or office.

The binding of a magazine or a series of magazine articles: Select a style of binding suited to the size and thickness of the magazine.

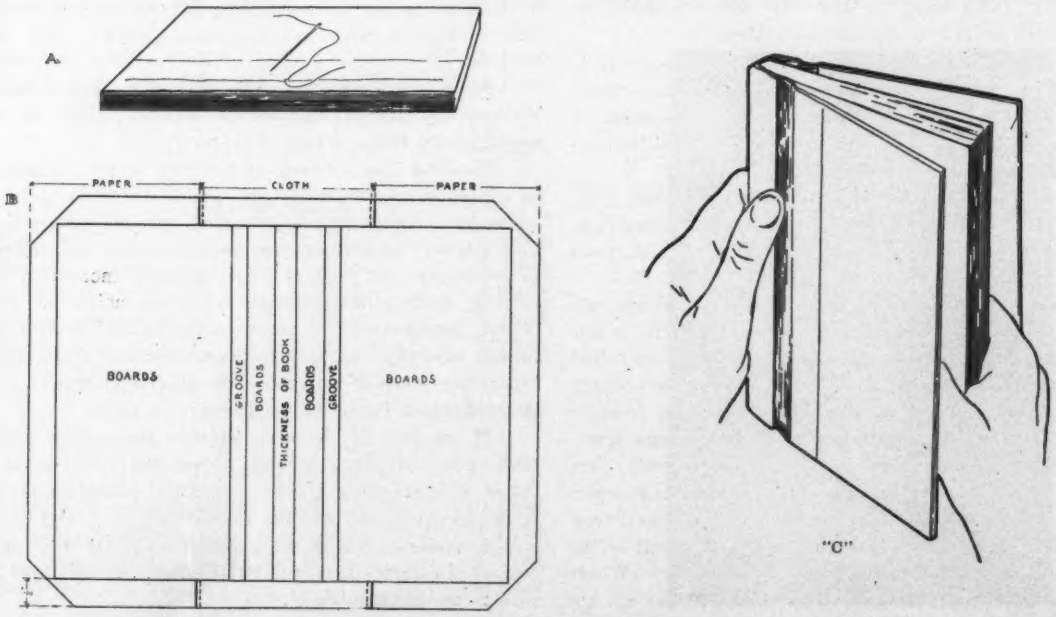


Figure 1. A. Single-Sheet, Japanese Sewing. B. Case Cover, Inside Construction. C. Fitting the Magazine into the Case.

The illustrations show two styles of magazine binding and a class of high-school girls working at the style most commonly used—tape sewing with a heavy buckram cover—artistic and durable.

While sewing frames can be used by a class of high school girls in 40 minute periods, yet not to advantage when the distribution of materials takes time. The use of the sewing frame can be illustrated by the teacher in a much less time and the student acquires the knowledge.

Illustration No. 1 is a binding for single sheets from a magazine, such as an illustration with a short text. In this case there is almost always something on the opposite side of the sheet to be hidden which is managed by pasting the backs of two sheets together. The single sheet binding is thin in appearance and is well suited to large magazines such as Collier's or the Saturday Evening Post. The pen sketches illustrate various steps in the binding. Figure 1A shows single sheets sewn together with Japanese sewing. There is an end sheet and a strip of cloth front and back. The cloth strips form hinges to which the cover will be attached. Figure 1B illustrates the case cover, giving standard measurements for the grooves and boards which help to form the hinges. On the outside, an equal amount of cloth shows on each side of the grooves and paper overlaps the cloth one-fourth of an inch. The same corner turning is given as in Figure 3E-tape sewing. Figure 1C shows how the magazine is fitted into the case cover. Paste having been put on both cloth hinges before fitting into the cover, paste in end sheets. Then cut small strips of board a little narrower than the one-fourth-inch groove on the outside. Fit into the groove and tie in place with tape and press. Illustration No. 3 is a "sewn on tape" binding.

In binding the ordinary size magazine, the cover and the wire staples are removed and the sections taken apart. All old glue is cleaned off and necessary repairing is done by guarding single sheets to sections, by guarding single sheets together and by mending holes

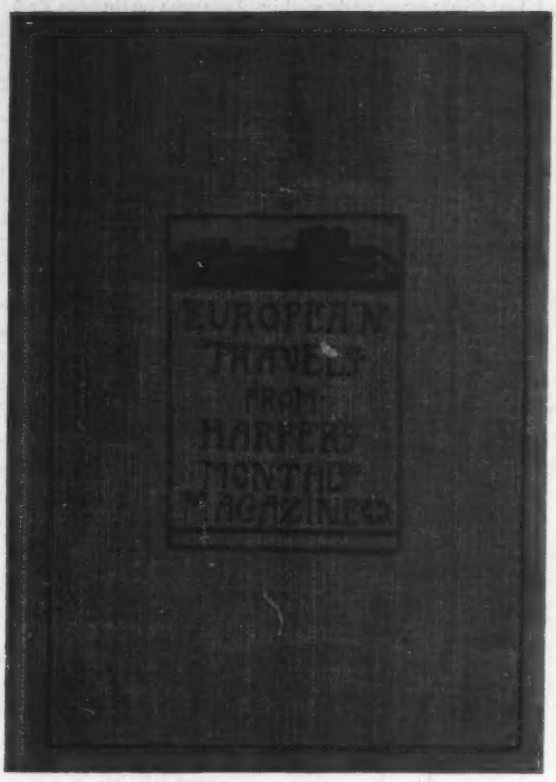


Fig. 4. A Tape Sewn Volume.

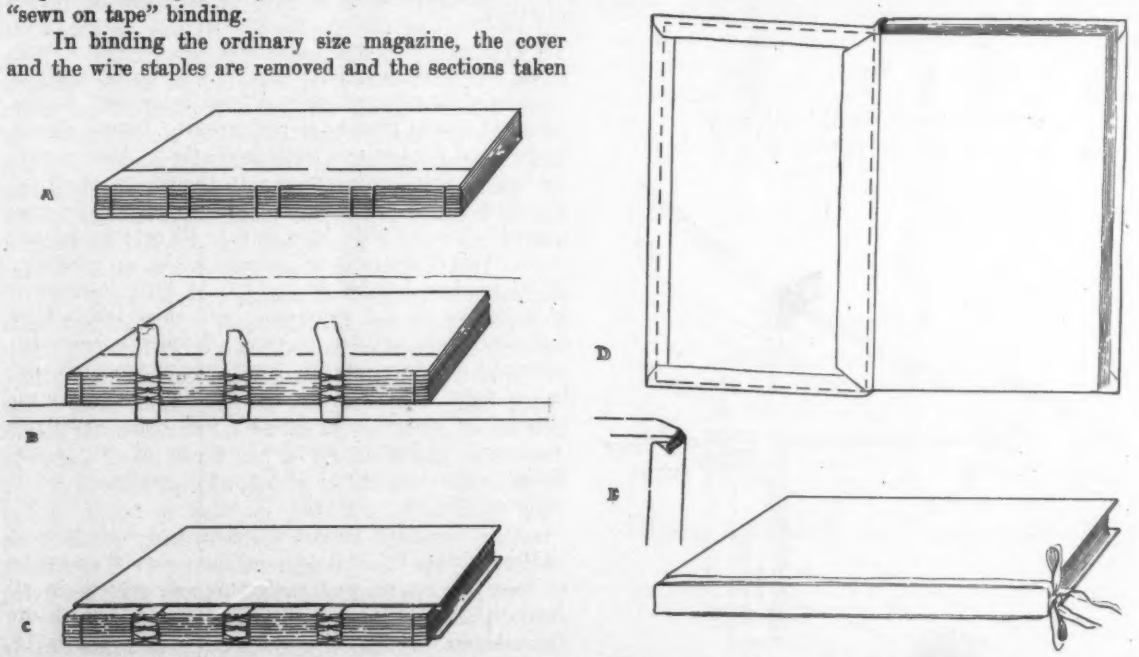


Figure 3. A. Book ready for Sewing. B. Sewing over Tapes completed. C. Boards Glued to Hinges and Tapes. D. Hinges Attached. E. Book Ready for Press.

and tears in pages with a thin Japanese vellum. End sheets and cloth hinges are then added to front and back by guarding them over one-fourth of an inch on the inside of the first and last sections.

Figure 3A shows the marking ready for sewing. Figure 3B sewing on tapes, tapes to be glued to cloth hinge. Figure 3C boards glued to hinges one-fourth of an inch from the back. Figure 3D shows the inside of the cover, cloth edges turned and hinge attached. The dotted line marks where the end sheet is to be pasted. The cloth cover is of tan colored Royal Buckram and is cut one-half inch larger than the entire outside measurement. A strip of oak tag board, cut just the length of the boards and as wide as the back, is pasted down the middle of the piece of Buckram for it is a "hollow back" book.

Figure 3E illustrates the corner turning—a little fold, then a big fold. The big fold shows plainly in Figure 3D. Figure 3E is the book completed, tied with tape to shape the ends while pressing and drying.

One technical point to be observed in any kind of bookbinding is the use of oiled paper between end sheets and covers while pressing and drying.

Suggestions for Architectural Drawing in High Schools

E. J. Lake

(Fourth Article)

Details.

THE best method of teaching the construction of details in buildings is to require pupils to make working drawings from measured details in buildings. A section and elevation made at scale from measurements taken from an actual building, not only teaches the construction of the details, but it gives a valuable impression of how the object represented in the drawing actually looks when built. This impression is necessary to all design.

The common construction of windows, doors, stairs, and cornices can be found in any school building. Pupils should have extension rulers, such as carpenters use, pads of paper on which to make freehand sketches, and be required to record dimensions and forms on a freehand sketch from actual measurement taken from details in the schoolhouse and other buildings that are available. Such a sketch is shown in Figure 15. From these freehand sketches, working drawings should be made in pencil at a convenient scale as $\frac{3}{4}''=1'$, or $3''=1'$, and inked or traced after the pencil drawing is finished.

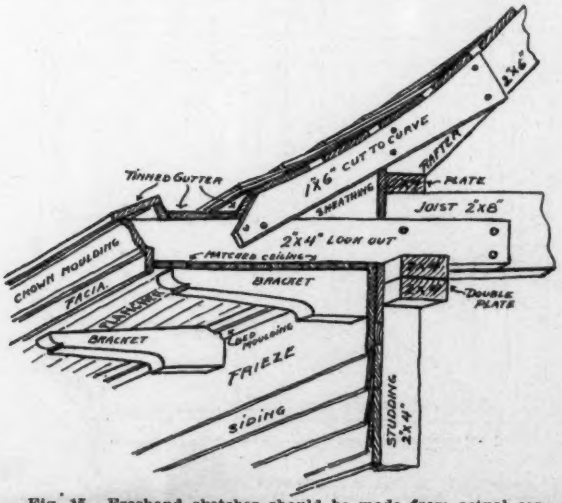


Fig. 15. Freehand sketches should be made from actual constructions by pupils to learn the sizes, names and construction.

In architectural practice it is customary to represent details at a small scale for the contractor's estimate and to furnish full size detail drawings as they are needed by the contractor in building. In tracing for blueprinting, the lines should be a little heavier than in mechanical drawing practice in order that they will print clearly.

Details of openings should be represented in section and elevation. The details of a window, for example, should be represented by sections thru the jamb, head, and sill, with a partial elevation as shown in Fig. 16. During the drawing from measured examples of actual construction, the pupil should be led to observe why details are constructed in a particular way, and stock forms in the drawing should be identified in a mill book.

It is not intended to give here the common details of the various parts of buildings. These can be obtained from building publications and from examples. In the design of details purpose should govern. Details should be designed for use and aesthetical effect. Use or purpose is the first consideration. In the design of all exterior parts the action of the weather should be considered. There should be a drip to all exterior projections. This is shown in the sill and in the cap moulding of the window detailed in Fig. 16. A little observation of buildings in any community will show the lack of sufficient drain and drip to carry off water. Discolored walls and rotting woodwork result from moisture allowed to run down over walls or back into the finish. No exterior detail should be so designed that water will stand in or on it. Rotting results from one of two causes. Either water is retained and wet-rot results, or air is excluded and dry-rot results.

Openings thru walls are designed to exclude wind and moisture. For this purpose there should always be at least one return, and preferably two returns in all joints. It will be noticed that the siding is housed into the sill, and that the sill is cut into the stool in Fig. 16. Direct joints, even between tightly nailed pieces of material, will result in the passage of air and moisture,

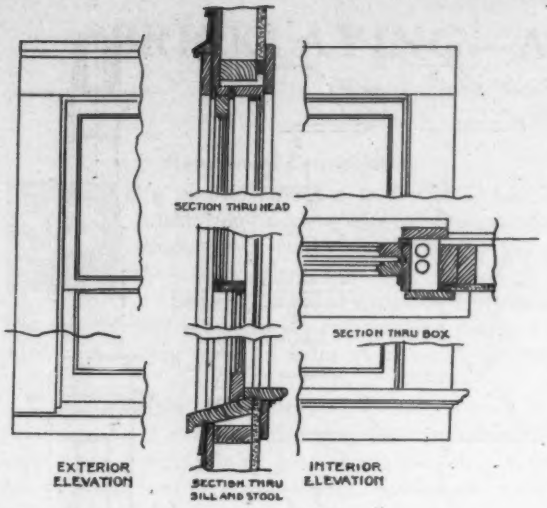


Fig. 16.

and good details of all openings are designed with at least one return. In framing construction, the open space between joists and studding should be filled at the end of joists by pieces cut between the joists and studding, to prevent the passage of air from cellar to attic and under the floors.

At the cornice, the sheathing should extend between the roof rafters to the roof sheathing. A dead air space is an effective preventive of the passage of cold, heat and moisture thru a wall, but a direct air passage transmits cold, heat and moisture. All exterior veneered brick or frame constructed walls should have building paper on the outside of the sheathing. Paper should also be laid between double flooring. Wood construction details should be designed to give as little opportunity for shrinkage as possible. Wood shrinks most across the grain. Broad pieces of wood should be housed into the adjacent pieces at the edges to cover shrinkage. Stair risers should be housed into the tread, and the risers and treads should be housed into the wall string, as in Fig. 17. Panels should be housed into the casing. False panels should only be used when the panel is backed up solidly and then the panel boards are fastened to the frame only. Bed mouldings should be fastened to one side of the angle only to allow play in shrinkage.

All common work should be designed to economize labor and material. Mouldings cut out of a panel board might be effective, but are very expensive. All tenoned joints, designed to withstand a pull, should be dovetailed as in drawer fronts and balusters. End grain should be covered in the design of woodwork, as the end of a stair tread, or the end of a window seat, is covered by a return nosing. Drawer fronts should be blind dovetailed. Cased or build-up posts are better than solid posts, but in good work the corners of cased up square posts should be strengthened and built up. Round or polygonal posts should be built up, jointed and glued.

Interior details should be designed for the purpose of sanitation and cleanliness, as well as appearance. Deep cut mouldings on casings are objectionable because they catch and retain dust and are not easily cleaned. Where contrast is desired in interior design, it may be well to secure it by color rather than excessive relief. The casing of an opening is for two purposes: First, it sets the opening apart from the wall and frames it for the same purpose that a picture is framed. Second, it serves as a protection to the wall on one side and the glass on the other. Both of these purposes are commonly exaggerated in the design of buildings by the use of heavily moulded or over wide casing. With the use of durable wall covering, very neat and sanitary casing can be made of the wall material itself, with an imbedded metal strip at the corner. One most common error in house design of recent years is the use of heavy casings of strongly accented wood in natural finish. The natural grain of wood may be so strong in accent that it is objectionable and should be modified and harmonized by staining. In interior design nothing adds to the unity of a room more than a continuation of lines of the finish. This is most effective when windows and doors head over at the same height and the continuous head casing gives the room a continuous frieze of uniform depth.

Details are designed for appearance as well as for use. These two conditions are not separable. Our sense of propriety in appearance is dependent on our sense of propriety in construction. Beyond this, details may be so related to the whole that a beautiful design is the result. Interior and exterior appearance in buildings is largely governed by structural needs. One of these is the need of apparent support in construction. Support must be evident as well as actual. Our impressions have changed with a change of materials used. We do not demand the size of columns in support that was demanded by primitive builders, because we know they are

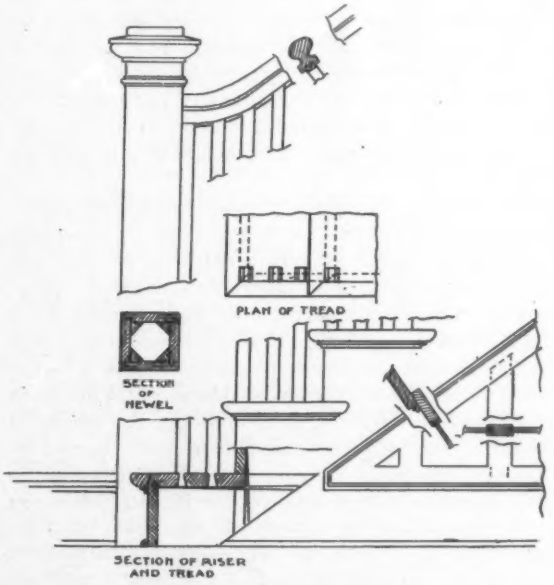


Fig. 17.

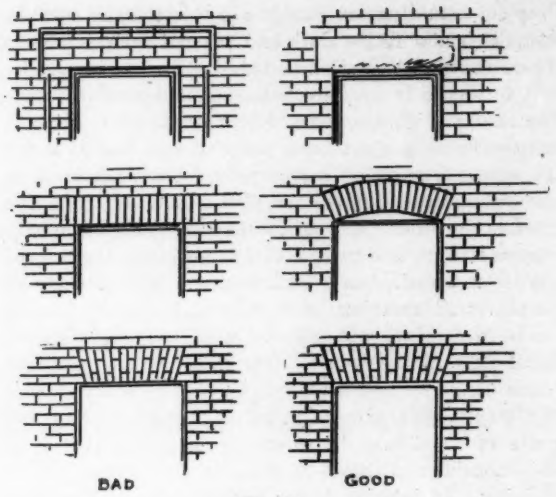


Fig. 18.
Construction and Support Should be Evident.

not necessary in the materials we use. However, an arch that is false and does not evidently act as an arch is objectionable even tho it supports the load above it. There is at present in building design a questionable use of arches that fall short of bearing on the walls, and a doubtful elimination of any evident support of brick and stone courses over openings when they are carried on hidden steel beams. These are the results of modern special constructions which, with the use of hidden steel beams, are made secure, yet do not satisfy our impressions. Every opening in walls built up of material in blocks should be covered by an evident lintel or true arch. (See Figure 18.)

A design must look durable and adequate as well as be durable and adequate. Weakness in appearance offends a refined taste, and periods of art have become decadent not because the works produced have failed in construction, but because they appeared as if they might fail. Broken pediments, elaborately decorated supports, affected construction and imitations of one material in another material are false and inartistic. Some precepts are useful in the composition of details to give effective results.

Decision is a necessity of constructed form. Profiles must not be in vague, undecided forms. Curves may be too nearly straight. (Figure 19a.) It is rarely advisable to use more than two curves in succession. (Figure C.) Two double curves even tho separated by a fillet are doubtful. (Figure E.) A double curve, a fillet and a single curve make a more decided profile. (Figure F.) A series of mouldings or members should not be in broken contour of almost equal divisions, but should be decided by the use of a dominant member, relieved by secondary members. (Figure 19H.) It may also be noted from the examples in Figure 19, that when one

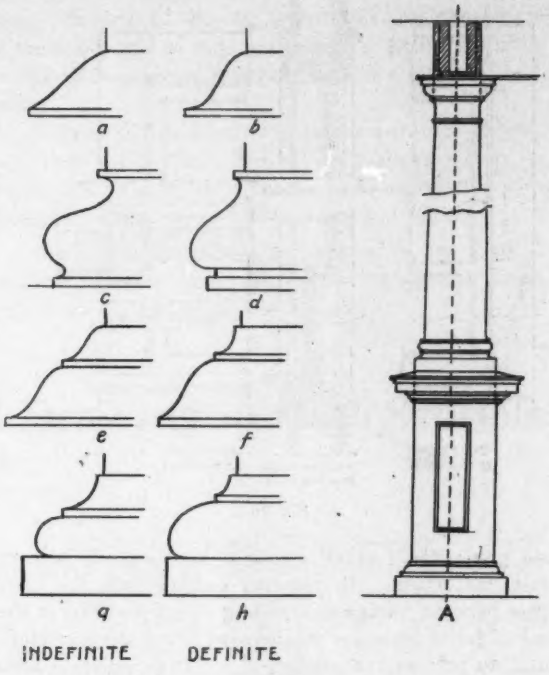


Fig. 19.

curve follows another, the adjoining ends should be either parallel or at right angles. A fillet between curves should have its sides at right angles to the adjoining curves. If the curves are acute or obtuse at their junction, the straight line between them should be perpendicular to one of them, and the more exposed curves should be the less acute.

Openings in walls expose the thickness of walls. The thickness of a wall is a strong element of expression in the design of a building. A wall with a small return at openings appears as a thin wall, and thin walls look weak. Splay in a jamb or batter in a wall gives appearance of weight and consequent strength, just as entasis in a column gives apparent strength of support. This may be and is commonly exaggerated in effect. In attached round columns, a little more than the half circumference of the column should be used. An exact half appears less than half when attached. Support should be made evident in a pedestal, column and frieze by having the center of the base, shaft and the frieze center on a vertical. This is illustrated in A, Figure 19. It may also be noticed from this figure that planes or surfaces such as the face of the pedestal should be in line with the stylobate above and that the frieze is in line with the neck of the shaft. A general rule is evident that in supporting members, there should be no part of the contour reentrant to the general profile. Such cutting down of the general support tends to make the structure appear weak.

"BRICKLAYING---AN INDUSTRIAL ART"

Wm. T. Gohn, Stout Institute, Menomonie, Wis.

(Third Article)

Materials of Construction.

AS a natural sequence to the tools used in bricklaying, a knowledge of the materials employed in connection with the use of these tools, is necessary.

Brick are made by moulding or pressing clay of different consistencies into various shapes and sizes, and baking them in kilns at a very high temperature.

The principal ingredients in brick are clay and protoxide of iron. The clay may contain other substances which either do no good or are absolutely harmful. Carbonate of lime in any large quantity will render the clay unfit for the manufacture of brick, as lime is fusible and brick is supposed to be a refractory material. Sand or silica should not exist in large quantities, never over 25%. An excess of sand causes the brick to become too brittle, thus destroying its cohesive qualities.

The protoxide of iron in the clay causes the brick to take on a reddish color when burnt, the color varying with the amount of protoxide of iron in the clay. If slightly fusible, the brick may be externally vitrified by the application of greater heat, thus producing a change from red to greenish blue. The effect of magnesia, or a small percentage of lime, in the composition of the brick is to change the resultant color, produced by iron, to a cream or buff. The Pompeian brick, now largely used, have the mottled effect produced by the addition of coloring matter to the clay, or by using a variety of clays in which there are differences of chemical composition.

In the early days brick were manufactured by the hand process; but in recent years this process has become obsolete and today all the brick manufactured in this country are made by machinery.

Processes of Manufacture.

Brick are manufactured by the stiff-mud process; the soft-mud process; or the dry-pressed process.

In the *stiff-mud process,* the natural clay is ground. It is then weathered, after which a sufficient amount of water is added to make a stiff mud.

This mud is mixed in the pug-mill and placed in the brick machine, which forces it thru a die, the exact size of the required brick. From this machine, the clay emerges in a continuous bar, which is automatically cut to the exact form of a brick. The mud bricks are then put upon "pallet boards" and placed in the dryers from 48 to 52 hours under a temperature of from 300 to 500 degrees Fahrenheit. They are then removed to the kilns where they are stacked ready for burning. After the kiln has been filled it is sealed with clay and fired. The temperature of the burning ranges from 1700 to 2000 degrees Fahrenheit. The burning process requires from ten to twelve days.

Soft-Mud Process. After its removal from the bank, the clay is thrown into a pit six feet deep and eight by twelve feet in area, lined with plank. Water is then turned into the pit and the clay left to soak for 24 hours. It is customary to provide about three of these pits, so that while one is being filled, another one may be emptied, and the third one soaking.

The clay, on being removed from the pits, is placed upon an endless belt conveyor which carries it to the machine. The upper part of the machine contains a revolving shaft having projecting lugs. These lugs break up and work the clay after which it falls to the bottom of the machine where a revolving spiral or "worm" forces the clay forward and a plunger with an up and down movement presses the clay into a mold, which is divided into six compartments of brick size.

When the mold is filled it is automatically forced out onto a shelf or table where it is emptied onto a "pallet board." The brick then undergo the same process as the stiff-mud brick.

After the brick have been removed from the molds, the molds are either dipped in water (termed slop molding) or in sand (termed sand molding) to prevent the clay from adhering to the molds. The sand molding process is considered the better as it gives cleaner and sharper brick.

Dry-Pressed Process. Under this process, the clay is used just as it is quarried, seeming apparently dry, yet containing 7% to 10% of moisture. This clay is stored under cover in order that a supply may be constantly on hand and also to further dry the clay. It is then thrown into what is termed the "dry pan." This is a circular machine of from 4 to 6 feet in diameter and having a depth of from 2 to 3 feet. The bottom of the pan is of perforated metal thru which the clay is forced by means of two wheels revolving on horizontal axles. From the pan the clay falls to a wide belt, passing over an inclined screen. Such portions of the clay as are sufficiently fine pass thru the screen onto a second belt, while the coarser particles pass into the dry pan again for a second grinding, from whence it is again conveyed to the screen for sifting. This second belt conveys the finely ground clay to the hopper of the press where the brick are made. The molds, being steel, are of the same width and length as the finished brick, but much deeper. The loose clay fills the molds after which they are automatically placed under a steel plunger which exactly fills the mold. This plunger, by hydraulic power, compresses the clay in the molds to the required thickness of the finished brick. The brick are then taken from the molds directly to the kiln.

Molded brick are made in a similar manner, the difference being that the box or mold is so made as to produce the required shape. In most of the dry-pressed machines a small jet of steam is admitted into the clay just before entering the molds. This is to slightly moisten it and cause better cohesion.

Classifications of Brick.

"Common Brick," including all those intended for constructional, and not ornamental, purposes, undergo no especial care in their manufacture. (Under this head we have three subdivisions, so named from their position in the kiln—arch or hard brick, body or well-burned brick, and soft or salmon brick.)

"Pressed or Face Brick," usually very hard and smooth, with sharp angles and corners, and true sides and beds, are generally laid only on the face of the wall. Pressed or face brick usually cost from two to five times as much as "common brick."

"Arch or Voussoir Brick" are manufactured for use over curved openings. They are similar in form to a truncated wedge.

"Circle or Compass Brick," used for building walls of circular bays, towers, and orioles, are molded to the shape of the circle desired. In ordering brick for these purposes, the radius of the circle should always accompany the order.

"Fire Brick" are used for the lining of furnaces, cupolas, fireplaces, tall chimneys, and other chambers where great heat obtains. They should be of uniform size and texture, free from cracks and flaws, regular in shape, and not fusible. In size they somewhat exceed that of the ordinary building brick. They are made from a mixture of about 50% of ground brick, terra cotta, raw flint clay, or other refractory material, together with about 50% of plaster clay. They are generally made by the stiff-mud and dry-pressed processes.

"Glazed and Enameled Brick" are especially adapted to the construction of non-absorbent and sanitary walls. This, however, does not imply that in all cases the entire wall shall be constructed of these brick. Their chief purpose is the wainscoting of halls and stairways and the lining of walls of bathrooms, hospitals, markets, and other public buildings.

Roughly speaking, the term enameled brick is given to all brick having a glazed surface, yet there is a marked difference between a glazed and an enameled brick. The difference lies in the process of manufacture. The enamel, being opaque, is fused directly into the brick, while the glaze is produced by first applying a slip, composed of ball-clay, kaolin, feldspar, and flint, to the unburned brick. This in turn is followed by a coat of transparent glaze, resembling glass.

To determine between an enameled and a glazed brick, it is only necessary to produce a fracture. On account of the enamel being fused directly into the brick, upon fracture it will appear to be a part of the brick itself, while in the glazed brick there will be a decided line of demarcation due to the application of the slip.

Size of Brick. Unfortunately in this country there is no legal standard regulating the size of brick. Different makers adopt different sizes according to the localities. Also in the same locality, the brick will vary in size according to the difference in temperatures when burning and the shrinkage of the clays.

The National Brick Manufacturers' Association has adopted as the standard size of a good quality of common brick, when burned, 8¼x4x2¼ inches, and of face brick 8⅜x4x2⅜ inches.

The standard "Ajax" fire brick measures 9x4½x2½ inches. For the special shapes and sizes, communication with the various manufacturers is advisable.

The weight of brick will vary according to the kind of material used as well as the size to which they are manufactured. Common brick will average from 4 to 4½ pounds. Pressed brick (due to greater density), weigh from 5 to 5½ pounds, while fire brick will average from 7 to 8 pounds each.

General Specifications.

The following requirements should be closely adhered to, in the construction of buildings in regard to the selection of brick as a building material.

First. They should be sound, free from cracks or flaws, and from stones or lumps of any kind, especially pieces of lime.

Second. The brick must be uniform in size, with sharp angles and edges, and the surfaces true and square to each other. Especially should this be so with all face brick to insure neat work.

Third. Good building brick should be quite hard and well burned. A simple and generally satisfactory test is to strike two brick together or with the bricklayer's hammer. If the brick will emit a metallic ring it is sufficiently strong for ordinary work. A dull sound shows the brick to be soft or shaky.

Fourth. The quantity of moisture a brick will absorb is also an important factor. A good, well-burned brick should not absrob more than 10% of its weight after remaining 24 hours in water. The hardest common brick will not absorb more than 5% of its weight in water, and where possible these brick should be used for foundations, piers and chimneys.

Fifth. The crushing load of brick suitable for such construction, should not be less than 4000 pounds per square inch.

Mortar, Lime, Etc.

Mortar is a combination of sand and some cementing material, as lime or cement, so proportioned as to make the mixture of a plastic consistency.

All walls, whether of brick or stone, should be laid in any one of the following kinds of mortar: "cement mortar," "lime and cement mortar," or "lime mortar." Where the soil is wet or damp, cement mortar should undoubtedly be used, but for ordinary sand or gravel soil, a mortar of cement, lime and sand meets all requirements, and for all walls above foundations a good lime mortar well serves the purpose.

In order to more fully understand the term mortar, I will endeavor to discuss briefly each of its component parts.

Lime. Pure, rich quicklime is the product of burning limestone. It is the result of driving off the carbonic acid and water from the stone during the burning process. Quick or lump lime is the commercial term and to preserve it from deterioration, before using, it should be kept dry and protected from the action of the atmosphere. Hence it is packed and shipped in barrels.

When exposed to the air for any great length of time, it will become what is known as air-slaked (that is, it will change from a lumpy condition to a powder). In so doing it absorbs the moisture and carbonic acid from the atmosphere and thus loses its strength as a cementing material.

Quick lime will readily slake in water (about 1½ to 2 times its volume) to a smooth impalpable paste, and if A-1 lime, without residue.

Sand for mortar should possess the following qualifications: It should be sharp, free from loam or earthy materials, and rather uniform in size of grains. It is chiefly found in its natural state, in banks or pits, or in the form of sand-bars in the river bottoms. The choice of sand from these two sources will vary with different localities. Bank sand is the sharper of the two, while that procured from sand bars is cleaner, due to the action of the water.

The price of sand will also vary with different localities, and is governed chiefly by the presence of the material, and the season of the year, together with the distance to be transported. It is usually sold by the cubic yard, weighing 2400 pounds.

Cement. There are two kinds of cement used in making mortar — Portland and Natural, (sometimes called Rosendale, from a town in New York, where it was first manufactured). The former is prepared by carefully proportioning limestone and clay or slag and burning the mixture at a high temperature in kilns, after which the resulting clinker is finely pulverized. The latter is termed "natural" on account of being made from the natural rock, which contains the clay and limestone in the proper proportions.

Mixing. In mixing lime mortar about one-half the amount of the sand should be distributed over the bottom of the box, to which the requisite amount of lime paste is added, after which the remaining portion of the sand. The mass is then stirred or mixed by the action of the hoe, adding water as necessary, in order to reduce the whole to proper consistency.

For spreading purposes the mixture should be one part lime to three or four parts sand, while for buttering a richer mixture is required, as one part lime to two parts sand.

In mixing mortars containing cement, the dry materials, (sand and cement) should be thoroly mixed before the lime paste is added. This is done to insure a more uniform mortar. Owing to the rapidity in setting, only small lots of cement mortar should be mixed at one time.

PROBLEMS IN DESIGN

Bonnie E. Snow, Millburn, N. J.

Lesson IV—Surface Rhythms, Continued.

THE eye and ear experience a pleasurable sensation in any kind of orderly repetition. For the ear, this repetition is manifested in the measured beat or meter of sound, which we find in music or in poetry; for the eye, there is the repetition of shape, color and movement, which we find so often manifested in the growth of leaves and flowers; in the colors of sunset skies; in the flight of birds, and in the movement of a field of grain, swayed by a light breeze. These sensations act potently on man's creative tendencies, and more or less consciously he is influenced to rhythmic manifestations in his own work, no matter how primitive or elementary that work may be. The decorative art of savage tribes, shown in their tattooing, their pottery, in their basketry and weaving, are illustrations in point. We are led irresistably to a consideration of rhythm as a fundamental art principle.

In our last lesson, we presented the form of rhythm known as surface pattern, and the problem was developed by means of a simple unit or motive, based upon a rectangle. Our present problem will be to use the diamond shape in producing another variety of surface rhythm.

Fig. 1 shows a rectangle of thin, stiff paper, such as ordinary writing paper, measuring about 2"x3". Fig. 2 shows the rectangle folded on one diameter, the long edge bisected in point A, and lines drawn connecting the point of bisection (A) with the ends of the folded diameter, points B and C. Parallel oblique lines are drawn about ⅛ of an inch inside BA and AC, forming a narrow pathway. It is important that the pathway be narrow for the reason that its width determines the distance between the repeated units in the surface pattern. Fig. 3 shows an arrangement of related shapes drawn within this pathway, and also shows the scissors in the process of cutting out the shapes. Here, again, it is essential that the pathways between the shapes be narrow in order that the group of shapes may "hang together." Fig. 4 shows the cutting completed and the unit unfolded.

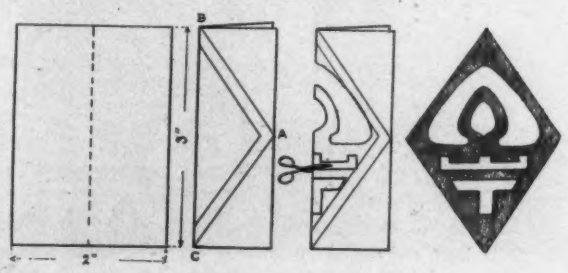


Fig. 1. Fig. 2. Fig. 3. Fig. 4

Let us plan to repeat our unit on a piece of tinted paper, of any size desired. (Fig. 5.) (The one actually used measured 5½"x8".) The first step is the drawing of a marginal line, about ¼ of an inch from the edges

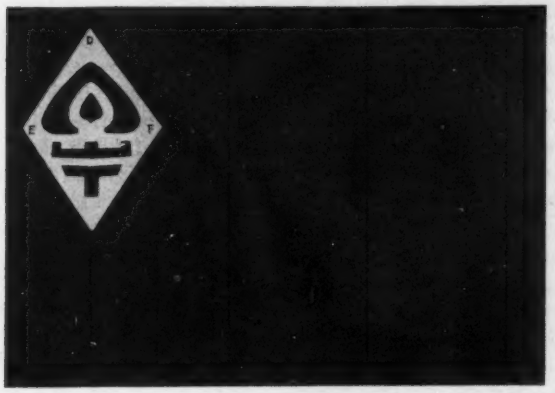


Fig 5.

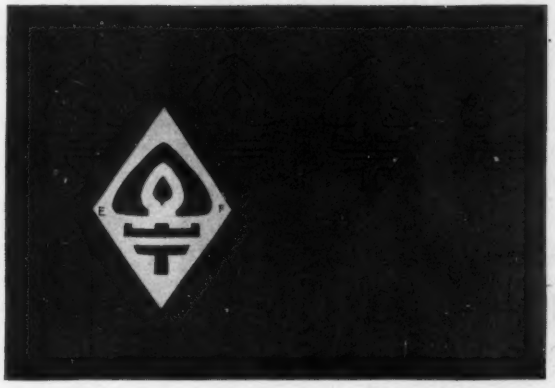


Fig. 6.

Fig. 11.

of the paper. Place the stencil so that point D of the stencil rests on the marginal line AB, and point E of the stencil rests on the marginal line AC. Mark the upper point of contact D'. Thru D' draw a light line, parallel to AC. The distances D'G, GH and HI, are established by setting off on the line AB the width of the stencil, EF. By tracing around the openings of the stencil we obtain the first row of units, as shown in Fig. 6, which figure also shows the stencil in position for another row. Notice that the outer shapes of the stencil almost touch the shapes of the upper units, and that points E and F rest on the vertical lines dropped from D' and G. Continue these tracings until the desired surface is covered, as shown in Fig. 7. In Fig. 8 the background areas have been filled in with a flat wash of color, or as it appears in the reproduction, with a tone. Fig. 7 is complete, so far as arrangement of the unit is concerned, and could be used as a pattern. It depends almost wholly on its line quality—that is, the pattern is developed by means of outlined shapes. In Fig. 8 there

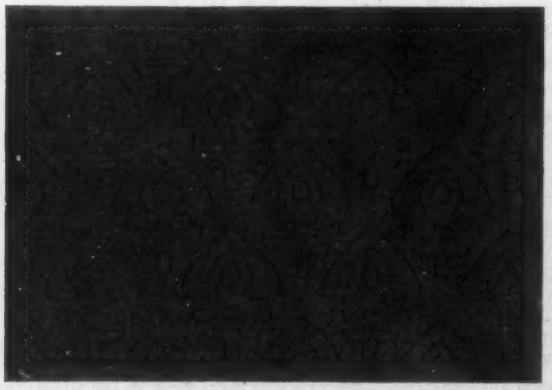


Fig. 7.

Fig. 8.

Fig. 9.

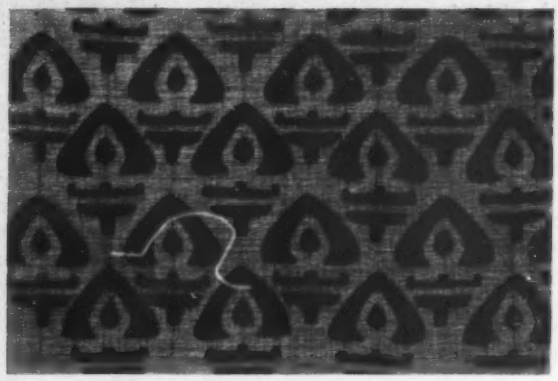


Fig. 10.

is the same arrangement of the units, but the great element of dark and light has been added and an entirely different effect is secured. In Fig. 9 the effect is varied still further by the employment of three tones instead of two. We see here a certain liveliness or sparkle that is not present in Figs. 7 and 8.

In Fig. 10, the unit has been stencilled on a fabric —a thin, sheer scrim, or grass linen. Such a fabric, stencilled with an interesting design, might well be used as a window-curtain. Or, if a heavier fabric were used, such as a fine crash, or a heavy quality of pongee silk, an attractive and unusual hand-bag might be made, as is illustrated in Fig. 11. The diamond-shaped unit here was stencilled in soft green and pink colors, on a piece of fine crash, warm-gray in color. The drawstring stays were of thin rosewood. Their purpose is to keep the top of the bag flat when closed, and they also add a unique decorative note. The drawstring itself was a silk cord, matching the crash in color. The bottom of the bag was not circular—it was made of an oblong piece of stiff cardboard, with rounded ends, covered with crash on the outside and the silk lining on the inside.

HAND-WROUGHT JEWELRY

H. R. Sorensen, Proprietor Orno Shop, DeKalb, Ill.

(Fifth Article)

THE making of a pendant similar to the one shown in the photograph, will be described in connection with a discussion of gold and the difficulties encountered in working with it. This pendant has an applied design and a faceted stone.

Fourteen carat gold is used in making this piece. The largest per cent of good jewelry is made of this grade of gold. Carat, which signifies a twenty-fourth, is a term used to express the proportion of gold in an alloy. The whole mass of metal to be estimated is divided into twenty-four parts. If eighteen of the parts are gold, the metal is said to be eighteen carat, or three-fourths pure. In a piece of fourteen carat gold, there are fourteen parts of pure gold and ten parts of alloy. The alloy consists of pure silver and pure copper.

More heat is required to melt fine gold (gold of twenty-four carats) than to melt gold of any other carat. The lower the carat of gold, the lower the fusing point. Twenty-four carat gold melts at 2016 degrees Fahrenheit, fourteen carat at 1991 degrees, and ten carat at 1982 degrees.

We have selected the topaz for the setting in this pendant. This stone has facets, is translucent, and its resting edge is at the middle of its height instead of at the base as in the case of a stone cut cabochon.

The reason for facet cutting of stones is to increase their brilliancy, hence, cutting of this style is done only on transparent or translucent stones.

A faceted stone should always be set in a double bezel and have an opening beneath for the passage of light rays. The process of making a double bezel was described in the April number.

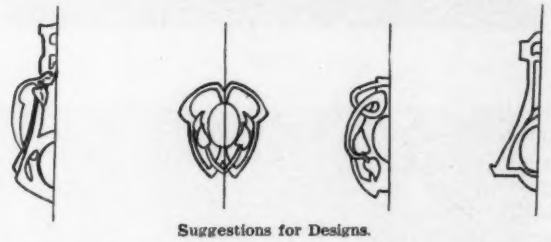
A few things should be said about the solder. While making a silver bezel, we used only one kind of solder, whereas we shall use two kinds on the gold. The seams of the two bezels should be soldered with fourteen carat solder. Then after the bezels have been fitted one inside the other, the solder used to join the two together should

Fig. 15.

be ten carat, as it flows under much less heat than the fourteen, hence this precaution partially eliminates the danger of opening the seams. When soldered, the bezel should be cleaned with sulphuric acid.

The faceted stone rests on the bearing made by the inner bezel, as shown at d, Fig. 15. Compare this with the resting of the cabochon stone at e, Fig. 15.

The pendant has three separate parts, Base, *a;* Bezel, *b;* Applied Design, *c*. Fig. 15. Now we can take up the work of portion *a*, which is the base or body of the pendant. For this the gold may be thinner than the silver we have been using, since gold is quite a good deal harder than silver. Instead of gauge eighteen, we shall use gauge twenty. Another reason for using a lighter weight, is that gold is much more expensive than silver. Gold costs from 66c to 70c per pennyweight, which is



Suggestions for Designs.

one-twentieth of an ounce. Silver costs less than 80c per ounce.

After selecting our material, the design is transferred to it. Only the portion *a*, (including the dotted lines), Fig. 15, is traced on the metal. When *a* has been cut out and finished with emery cloth as in previous problems, the leaf forms, *c* are made. This part is made of gauge 22 gold. After this part has been sawed out and finished with emery cloth, the leaves are formed a trifle. This is done by placing the leaf forms on the lead cake and dapping the reverse side of the gold with a ball punch, Fig. 16.

To give the effect of one leaf going over another, the edge of the upper leaf can be filed in with a fine needle file. This really belongs to the branch of carving which is done with gravers, and will be fully explained in a later number.

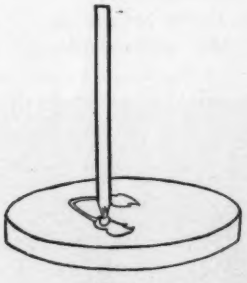


Fig. 16.

After the pieces *a* and *c* have been finished, we are ready to solder the bezel to *a*. Try the stone in the bezel to make sure that the bottom of the stone is flush with the bottom of the bezel. Cut away enough of the parts indicated by the crosses, Fig. 15, so that the bezel fits down very snugly between these ends. Now we are ready for soldering, providing that all parts have been thoroly cleaned. One should be even more particular in this respect, working with gold than in working with silver.

A small piece of solder is placed on the reverse side where the bezel makes connections with the base. With the work lying on the charcoal, the soldering is done as in the previous problems.

At this point, there will undoubtedly arise some difficulties. These cannot be overcome by anything except a lot of practice. So, in order that one may become acquainted with the action of gold solder, it might be advisable for one to experiment with a piece of scrap gold. A point always to be kept in mind is that the parts to be soldered must be heated evenly.

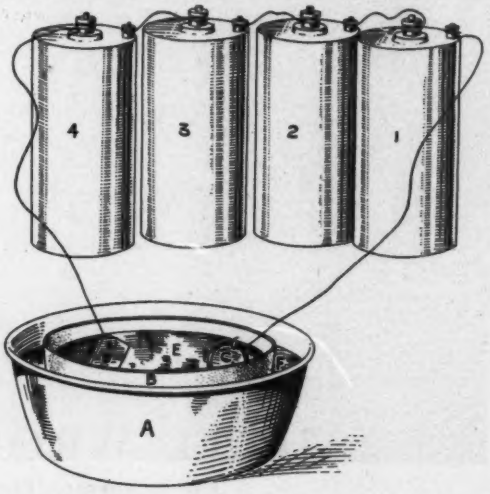


Fig. 17. Simple Apparatus for Gold Plating, 1, 2, 3, 4 Batteries properly connected. A Granite Pan, B Earthenware Vessel, C Piece of jewelry to be plated (Cathode), D Piece of the fine gold (Anode), E Plating Solution, F Water.

The bezel is now soldered to the base *a*. Following this operation, the leaf portion is applied. There is a possibility that the general shape of the leaves has been altered while forming them with the ball punch. This of course must be remedied by bending and shaping them so that they fit properly around the bezel and to the base or body. After the leaves have been fitted, they should be soldered at the points where the stems cross the base and where the leaves touch it. Very small pieces of ten carat solder should be used.

It is necessary that two small rings be soldered to the pendant for the attachment of the chain. When doing this soldering, it will be necessary to heat the entire pendant gradually, so that the rings may not get hot too soon.

A chain of gauge 22 gold wire should be made after the method of making a Coat Chain, explained in the March issue.

The entire pendant should now be pickled and cleaned thoroly. The stone is set in the same manner as described in previous numbers.

The finishing of gold is quite different from the finishing of silver. Gold work is finished by polishing it brightly or by covering it with a deposit of fine gold

which is commonly called Roman or Rose finish, and which must be done by a process known as Electro-plating. In order that a good finish may be obtained by electro-plating, it is necessary to polish the work first and satin-finish it. The polishing is done by first using felt buffs and bristle brushes touched occasionally with a bit of tripoli, which is a polishing preparation.

After all scratches have been removed, the work is boiled in water with a little strong ammonia and soap. This mixture with the assistance of a brush, removes all the greasy substance left by the polishing. The satin finish can then be applied by using the steel wire brush. The work should be cleansed again and it is then ready for the plating.

The operation of electro-plating can be performed by a beginner without a great deal of expense. A plating outfit can be made with the following material.

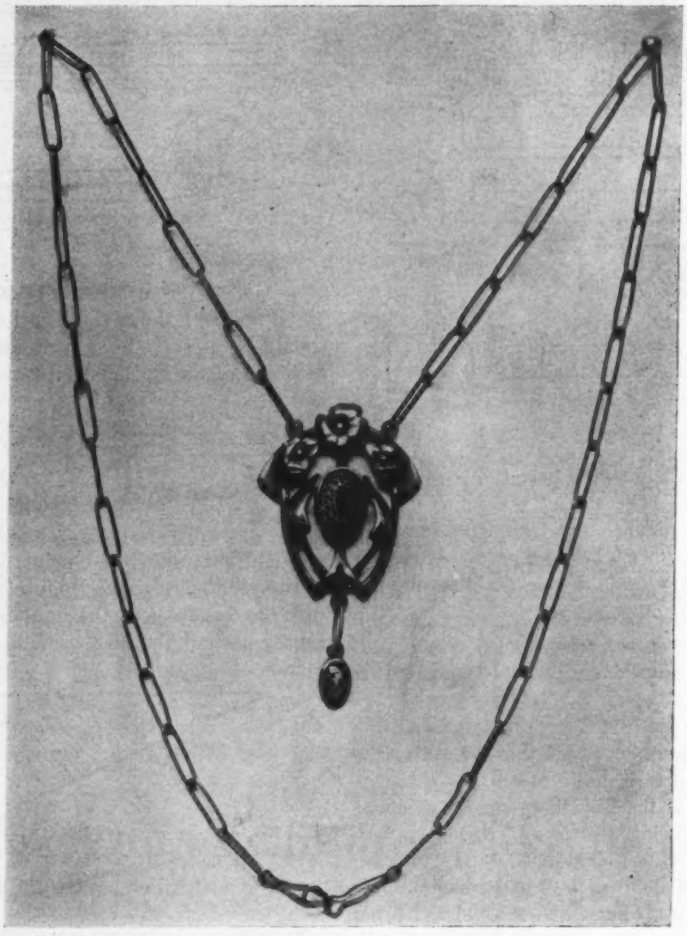
Four dry batteries.

Six feet of thin copper wire.

Gas plate with single burner.

Piece of thin fine gold, ½"x1".

One quart of distilled water.



Glazed earthen vessel large enough to contain the quart of water.

Vial of Chloride of Gold (15 gr.).

Granite pan quite a bit larger than earthen vessel with which it is used as a double boiler.

Directions for making solution and using batteries:

The distilled water and about one cubic inch of Potassium Cyanide, C. P., (a deadly poison) are put into the earthen vessel. This should stand for 24 hours. Then the 15 gr. of Chloride of Gold are put into the solution, which is then ready for use.

The batteries should be connected with short pieces of copper wire, which should be scraped well at the contact points. To connect two batteries, one end of the copper wire is attached to the center clamp of one battery, and the other end of the wire is attached to the outside clamp of the second battery. A third battery is attached to the second in the same manner, as is also a fourth attached to the third.

A wire long enough to reach from the batteries into the solution is attached to the center clamp of the fourth battery, and another piece the same length is attached to the outside clamp of the first battery.

Of course it is understood that the center clamp of a battery is called the positive pole, and the outside clamp is called the negative pole.

The piece of fine gold, called the *Anode,* is attached to the long wire which is attached to the positive pole. The article to be plated, called the *Cathode,* is placed on the end of the other long wire. By putting the anode and the cathode into the solution, the circuit is completed and the electro-plating takes place. Care must be used not to bring the anode and the cathode into contact with each other.

When the article to be plated has become a dark brown, it is removed from the solution and rinsed. It is then polished with a little soda until the desired shade and finish are obtained.

PRACTICAL SCHOOL SHOP FORGING

Thomas Googerty, Pontiac, Ill.

(Fifth Article)

Exercise No. 11.

Bolts may be made in one piece by upsetting the end of a bar, then squaring the head by driving the piece into a heading tool. A bolt may also be made by welding a collar around the end of a bar after which the head is squared.

Figure 88 shows a welded bolt head. After the stock is cut to proper length, the collar for the head is

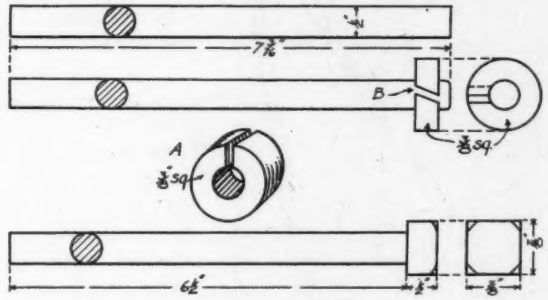


Fig. 88.

made. It is heated and hammered over the horn of the anvil to make it round. The end of the collar is now cut off on the hardie, cutting clear thru from one side and giving it a bevel. The other end is cut from the opposite side giving it a bevel also. See drawing A.

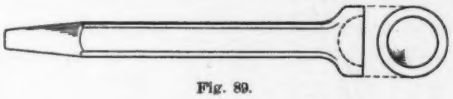


Fig. 89.

The collar is driven on the end of the bar while the collar is cold and the bar is hot. When the collar is hammered on the end of the bar, there should be about 1/8-inch crack. See drawing at B. The reason is that, in welding, the collar is lengthened. Hammering stretches the metal and it must have end room. When the collar is ready the bar is heated on the end and upset just a little. A heat is then taken and the collar is

Fig. 90.

welded by striking it on four sides, letting the opening form one of the corners. The bolt is then inserted into a 1/2-inch hole in a heading tool to smooth the end of the head with a hammer. A cupping tool is next set on to the head and given a few good blows with the hammer. This bevels the top corners of the square head. A cupping tool is a piece of tool steel with a half round depression in one end. See Figure 89.

The heads of bolts can be beveled with the hammer, instead of with a cupping tool. Figure 90 shows a tool to be used in the vise to make heads on light rods. The rod is heated and inserted into the hole; then the vise is tightened after which the ends are hammered down.

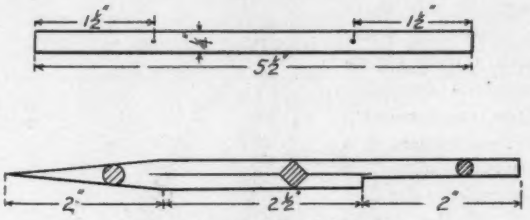


Fig. 91 (above). Fig. 92 (below).

Exercise No. 12—Forging a Gate Hook.

Figure 91 shows the length and size of stock which should be of soft steel. One and one-half inches from each end of the bar is marked with a center punch. One

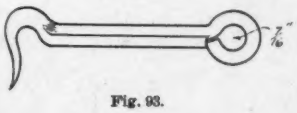


Fig. 93.

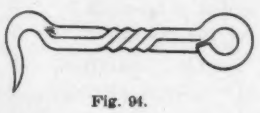


Fig. 94.

end is drawn round to a point. The other is hammered round for the eye. See Figure 92. In the drawing Figure 93, the eye and the hook are shown turned. The center part of the hook is square and is to be twisted.

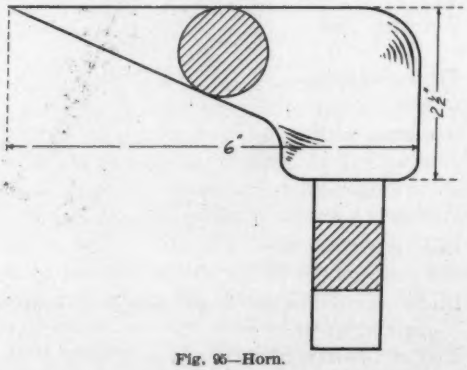


Fig. 95—Horn.

This is done by heating the square part to a uniform heat and cooling each end. The hook is then twisted with two pairs of tongs, or it may be caught in a vise and twisted with one pair of tongs. See drawing of the finished hook, Figure 94.

Figure 95 shows a tool called a horn; it fits into the square hole of the anvil. It is used to turn very small eyes at the end of a bar. A piece of 1 1/2-inch round soft steel is used in making it, by drawing the end square to fit the hole in the anvil. It is afterwards bent over and the taper drawn as shown.

Exercise No. 13—Making a Hay Hook.

Figure 96 shows the stock to be used, which should be soft steel. The eye is first turned, using 11 inches of the bar. The end is then heated and drawn to a point after which it is bent as shown in the drawing.

Exercise No. 14—Welding Ring.

Figure 97 shows a drawing for a ring to be made from ½-inch round stock cut 10 inches long. The whole is heated red at one time and then formed into shape by hammering it over the horn as shown in Figure 98.

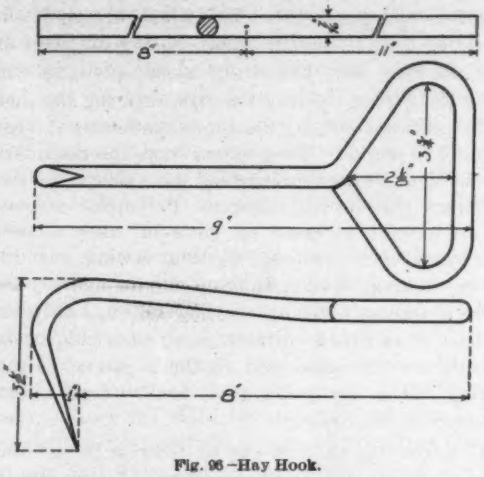


Fig. 96—Hay Hook.

The ends are now heated and scarfed in the same manner as described for the welded link. When they are lapped and ready for welding, they should look like Figure 99. Notice that the ring is made egg shape so that a heat may be taken directly on the ends of the scarfs and not at the sides. The ring when welded is formed round.

Another method of welding rings is to upset the ends and then form the rings. It is scarfed as explained above. This is seldom done in practical work because it is too slow, and the other method is about as strong.

In welding the ring, it is handled in the same manner as in welding links. To find the amount of stock for rings, the inside diameter plus the thickness of stock is multiplied by 3.1416 or 3 1/7. To this is added enough stock for the lap of the weld. For example a ring is required of one-inch stock. The inside measure is 10 inches. Solution: (10 plus 1) x 3 1/7= 11 x 3 1/7=34 4/7 plus ½ inch for welding.

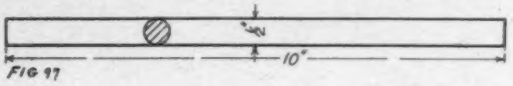


FIG 97

Fig. 98.

Fig. 99.

Fig. 97 (above)

In heating a piece of iron to be formed into a ring, it should never be heated to the welding heat. A welding heat on any piece of work that is not to be hammered destroys the texture of the metal. Any piece of work to be formed, should be heated evenly and not too hot.

Iron when heated expands, for example, a piece of stock 12 x 1 x 5/16 is heated red its entire length and then measured; it will be about 12¼ inches long. When the piece is cooled it will go back to its original length of twelve inches.

In making bands or tires for wagons, they are made a little short, then heated and put on, letting them shrink to their original size, which makes them tight.

Things Young Children Like to Draw

Mary E. Williams, Supervisor of Drawing and Industrial-Arts, Danville, Illinois

"THE spontaneous interests of children become the dominant factors in education, whether they are recognized or not."—*George E. Dawson.*

Having been taught by the old formal method, in which drawing was based on a geometric foundation, I can appreciate the child-study movement which has taught us to consider the interests of the young and growing child. I agree with the teachers of physiology and with the students of genetic psychology that we must consider the natural reactions of childhood. We must also consider the individual child and his environment.

After interpreting many hundreds of childish sketches, I find that the drawing of the young child is a normal means of expression. If we turn to primitive man's methods of expressing himself, we feel that the pictures made by these people were merely records of events that occurred in the daily life of the actors. The artist tried to show, as well as his skill would allow him, how the event occurred, and how the actors looked and acted at the time. The child's pictures, like these crude primitive ones, are merely records of events that occur in the daily life of the child. The more strongly the incident or event appeals to the child, the more vigorously will he work to portray his idea of it. The choice of subject-matter then, becomes a very important one. The subject must be one of real interest, and intimate acquaintance to the children.

When the child first enters the school, we find that his interests and experiences are bounded by his home life and by the community in which he lives. We first

First Grade—Goldilocks Going to the Bear's House.

make use of topics chosen from the home and its industries, from the child's games and from the customs and activities of the community. We draw objects in significant relation, such as—street scenes, means of transportation, sports and games, incidents of special days, objects in their proper relation to the seasons, trades and business occupations carried on by the community, the feeding and the care of pets, soldiers marching, and the thrilling incidents of the country fair and the circus.

I find that all children show intense interest in drawing soldiers marching or drilling. Perhaps it is because so many of their ancestors were soldiers. They delight to draw sailor boys and ships. Hunting stories, and tales of fishermen and the sea make a strong appeal to their childish fancies. Children like to draw things grotesque or comic, such as—witches riding brooms, masked figures, jack-o-lanterns, brownies, etc. When a show comes to the city, how children delight to illustrate it! Their childish joys derived from witnessing the marvelous sights of the show, with the big animals, the strange people, the odd-shaped and bright-colored vehicles, and the races and other wondrous performances of the show, are lived over again while making the illustrations. Anything unusual or spectacular, and things with which sound and color and action are associated appeal to young children.

While the work of the lower grades is to be made free and individual, it should also reflect the particular interests of the school, and of the community. We try to devise a course of study in drawing and in industrial-arts, that is particularly adapted to the school in which we offer it.

The character of the community makes its impression on the child. My varied experiences with rural schools, and with towns and cities, have led me to note some differences in the interests of the little people. While all children are interested in animals, the country children have intense interest in many activities in which animals play a large part. Besides a variety of pet animals, which they delight to draw, they like to draw occupations and games in which animals are used; such as—driving cows to pasture, games with goats, dogs and ponies, mowing hay, harvesting wheat, planting corn, tending the garden, feeding the pigs, shearing the sheep, milking the cows, picking the apples, gathering the eggs, and going to market. They have a more intense interest in drawing pictures representing the various activities of the home than do city children. Perhaps it is because they are taught to assist in more of these domestic duties; such as— sweeping, dusting, sewing, mending, washing, ironing, baking, hanging out the clothes, feeding the chickens, watering the flowers, etc. City children have more intense interest in street scenes, in children's parties, in dances and rhythmic games, in going shopping and in city trades, than do their freer brothers and sisters of the country.

Children like to draw and to decorate things useful in the school as well as in the home. Young children are interested in drawing and in decorating objects for the doll's house, curtains for the schoolroom, and in making drawings for the blackboard. Work in language and in literature, number work, nature study or any of their school subjects, when made to gather around a common center, are interesting to them. Many subjects run naturally into art, and in combination with industrial-arts, the subjects yield a great variety of themes.

During the latter part of the child's first school year, the simple story of "Hiawatha" makes a very interesting center for the subject of drawing as well as for construction work. (I refer you to my article in the March number of this magazine on the "Guiding Prin-

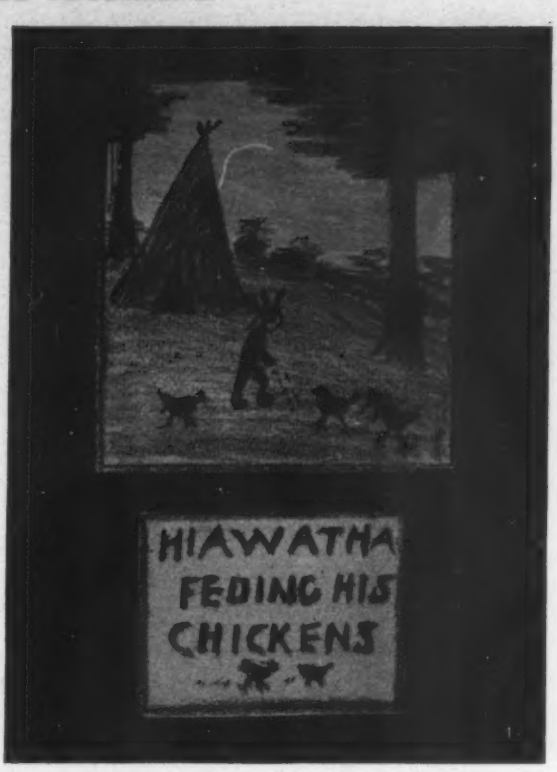
A Third Grade Drawing Illustrating an Industry.

ciples for a Course in Industrial-Arts for the Elementary Schools.") We have the children read the story or we read it to them, then they act out the part which we wish them to illustrate, before they draw or construct it. In order that the children may become familiar with the separate objects, we draw a number of them, such as the wigwam, the canoe, the pine tree, etc. We then combine these separate elements, forming a pleasing landscape. We draw the Indian cradle, Nokomis, then Nokomis carrying Hiawatha in a cradle. We make cuttings which combine with these drawings and produce beautiful and interesting scenes. The children never tire of drawing the animals which Hiawatha calls his "brothers," and the birds which he calls his "chickens." With what intense delight do they combine these drawings of animals and birds with action sketches in which Hiawatha feeds his pets, talks with them, allows them to run over his body, sit on his shoulder or hand, or plays with them in some way.

The first year of school the child also visits the people, the animals, the birds, the fishes, and the plants in myths and in Mother Goose stories. The well known interest of young children in these stories, and their universal use in language, reading, nature study, etc., prove the value of these stories for illustrative purposes. Since the child naturally follows closely in the footsteps of his ancestors, stories of primitive life appeal to him, and since children are interested in the doings of other children of about their own age, the stories of "Docas, the Indian Boy" and the "Ten Boys Who Lived on the Road from Long Ago to Now" are very fascinating stories for the children of the second and third grades. We select significant incidents from these stories, talk them over, dramatize them, and then construct or draw them.

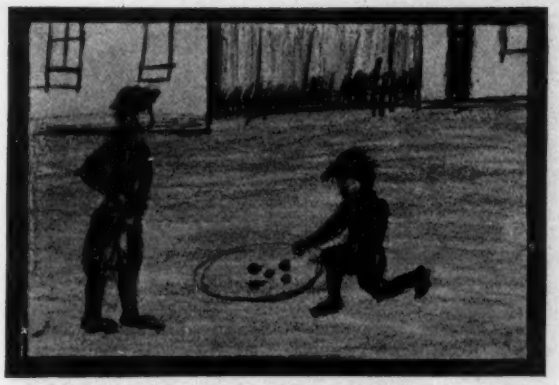
In order that I may depict the possibilities in one chapter in one of these books, allow me to give in detail the outline of the work as we give it in the life of Kablu. We describe Kablu's house and its furnishing, and then construct and draw the house. We draw the mountain scene with the mountain forming one side of the house. We discuss early methods of making fire and the value of fire to man, then we dramatize primitive methods of making fire and draw the actors. We discuss the sun

Third Grade Work Illustrating an Industry.



Leaf from a Booklet, Hiawatha's Story, Class of A-First and B-Second Grade.

worship, noticing the value of sun to man in furnishing heat, light, and food. We then dramatize the simple worship with the fire blazing on the altar and the sun coming up in the east and shining on the actors. We discuss the morning meal, how the grain was grown, how the soil was plowed with their clumsy wooden plow, how the seed was sown and how it was harvested. We dramatize and draw these incidents and compare early methods of farming with those of the present day. We notice that the forks and knives used in the simple meal were merely pieces of copper and that the plow used in preparing the soil did not have even an iron point. We can notice the use of iron in the industries of today, and we dramatize and draw some of these occupations. We discuss Kablu's clothing and the early methods of spinning the yarn, dyeing it, and weaving and making it into cloth. These methods are also dramatized and drawn. After depicting the destructive storm, we draw Kablu as he sits in his studious posture on the great rock against which the house had stood, and thinks how to bring good out of disaster. We visit Kablu's clay beds and watch him in his early methods of making pottery, and we make and draw simple pottery. We watch the men as they fell the trees and build the new house, and we notice the difficulties of building then, as compared with that of today. We discuss the year that followed, and we watch Kablu as he wanders from place to place in search of food for his flocks. We draw sheep, cattle, and goats, then Kablu as he herds his flock. We discuss the advantages and disadvantages of moving west, em-



Third Grade Work Illustrating a Game.

Third Grade. Darius and Zadock from "Ten Boys."

phasizing the people's idea of the wild Dasyas. Here we can lead the children to think of a time when people had no shelter except the trees or caves, no food except roots, fruits, nuts or wild seeds, no clothing except skins or bark, and not even a language that could be interpreted.

We notice the bravery of these Aryan people and their trust in an unseen power, as they plan to go to conquer those unknown regions. We discuss the Aryan's method of measuring time as compared with that of the present day. Now we are ready for the long journey. Having drawn the actors in various scenes and the sheep, cattle, and goats, we are ready for the pupils to make an original drawing of the people as they move down the mountains taking their flocks with them. Almost all the work has been planned with the children and directed by the teacher.

Where animals are to be used in the story, toys representing as perfect types as it is possible to obtain, are brought to the school and drawn. Toy vehicles and houses that have been constructed by the children are used as models in the drawing lesson. Definite trees, that are described in the story, are studied by the children, and drawn by the teacher, before the pupils attempt to draw them. The children are interested in these elements because they have a definite meaning to them in the story they are illustrating. It is Hiawatha's pine tree, or Kablu's goat that the child is drawing, and Hiawatha and Kablu are on intimate terms with him.

If separate elements that have become familiar to the child are drawn on the blackboard and the children allowed to combine them into significant groups, many original groupings may be obtained and these drawings often show great power of expression. Since no two children will combine these elements in the same way, the exhibition of their work becomes a source of both profit and pleasure to them.

These stories are within the mental grasp of the children and if they are given in an interesting way, I find that children are intensely interested in dramatizing and in illustrating them. Children cannot perceive drama as grown persons can, unless they are allowed to give expression to it. The man carries with him psychic material, and by systematizing a mass of experiences that give significance to the subject, he is able to appreciate it immediately. The child cannot do this, for the object does not carry with his consciousness a wealth of imagery previously selected and systematized, hence he must build up his images by slow degrees. Until he has done this, and has acquired a technique by means of which he may give expression to these ideas, we cannot expect much good original work from the child. James says, "The average man sees imperfectly and images dimly. His images have broad fringes." We aim to develop the power to see, to help the children who come under our supervision to image more clearly and to express their thoughts more intelligently thru graphic representation.

Children like to imitate their teacher's drawings, and when they are fortunate enough to have an instructor who has ability to draw well, they learn much by imitation. We encourage these teachers to draw much in the presence of the children, to take advantage of every opportunity to illustrate her instructions in all subjects by drawings on the blackboard. This will influence the children to use drawings freely as an aid to expression.

I find that the young child has a power of directness in expression that is not shown by pupils of intermediate grades, unless this power is carefully directed and preserved. We hope to so direct the work as to lead children to make definite progress from grade to grade. This we feel is being accomplished by illustrating subjects of vital importance to the children and by giving the work in this step by step method.*

I have made a study of children's drawings, not that I might allow the child to choose his own subjects and give expression to them in a loose way. On the contrary, the child needs wise guidance and definite directions. I wish to give him the refinement that comes thru correct drawing, as well as to conserve his power of self expression. I should first determine what is interesting to children of various ages, and which of these interests should be nurtured. Then, I should systematize and utilize these interests as subject matter for the work. The correct representation of the work will come more easily because of a keen interest in the subject matter itself, and because of a variety of methods in rendering it.

"Wouldst thou know how to teach the child? Observe him and he will show you what to do."—*Friedrich Froebel.*

*I am indebted to Miss Buckley of Chicago Art Institute, for this method of using illustrative material.

"Some Things to Remember in Doing Forge Work"

Do not leave tongs in the water trough or coal box. They should be kept on the forge or in the tong rack.

Do not heat tongs red and then cool them in water. This destroys them.

In heating short pieces handled with tongs, always keep the tongs out of the fire until the pieces are nearly hot.

Remember to shut off the blast before removing iron from the fire.

Tongs must not be hammered when cold; they will break.

Always pick the cinders out of the fire with a poker.

Do not drum on the anvil with the hand hammer. This breaks pieces from the hammer.

Never use coal on a fire until it is thoroly mixed with water.

In drawing out iron, always have it at welding heat. If it is not, the iron will split lengthwise.

Never plunge a heated piece of tool steel into ice cold water to harden. Water should be heated to 60 degrees Fahrenheit.

In heating metal, always stay at the forge and watch it closely so that it may not be overheated.

When leaving the forge, if only for a second, shut off the blast.

The first blow struck on a weld should be a light one, followed by heavier blows.

Always use a heavy hammer when welding.

If after tempering a cold chisel, it cannot be cut with a saw file, it is too hard and will break.

When in doubt as to whether a piece of metal is carbon steel or not, heat it and cool it in water, and then try it with a file for hardness.

Do not get into the habit of pouring water around the fire.

Always have the metal quite hot when upsetting and keep it straight.

In hardening spring steel and wood tools, use oil as a quenching bath.

If the handle gets loose in a hammer, put it in the water trough for a few minutes. A handle can always be kept tight by giving it a little water.

Never wedge handles in anvil tools. Let the handle protrude thru the eye one inch or more.

---Thomas Googerty.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

WILSON H. HENDERSON . . . . Hammond, Ind.
S. J. VAUGHN . . . . . DeKalb, Ill.
E. J. LAKE . . . . . Champaign, Ill.

EDITORIAL

DRAWING AND APPRECIATION.

"We must not forget that artistic drawing is not a language that any large number of adults will ever speak."

"The chief thing that will persist is appreciation."

"Most, even of those that show most talent in school, will drop it as soon as they leave, so that the time spent upon it, even tho it involves some valuable co-ordination of eye and hand, might be better spent."

"Thus, we *must conclude* that quite enough in time and money, if not too much in the aggregate, is now spent upon drawing in our schools at large."—*"Educational Problems," G. Stanley Hall.*

It may be interesting to place the various subjects of the school curriculum in the place of drawing in the first two statements quoted above.

How many of our school subjects are "languages that large numbers of adults speak"?

Is it not true that most of our school subjects are *valuable for the appreciation they instill* rather than for the facts learned or the skill attained. This may not be deplored. Our school subjects are largely means to an end and not ends in themselves.

The funnel is the symbol of Munich as an educational center. It signifies that Munich can give knowledge even tho it is necessary to pour it into the victim thru a funnel. The funnel, however, is not an ideal educational symbol.

If there is one principle established by pedagogical study it is that teaching consists in developing reason and appreciation, as well as imparting facts and developing skill.

The first statement quoted above measures drawing as a school subject on the basis of direct use in a vocation. The assumption is that large numbers of people do not use drawing in their business. Hence why teach it? For appreciation! Yes! Can appreciation be taught better than thru drawing? While freehand drawing is used in some trades and professions, it has rarely been taught in our schools to that end.

With increasing attention to vocational instruction, freehand drawing will have increased application. This training may well be of a particular kind and for a definite purpose.

Pictorial or illustrative drawing of a detailed kind will be necessary only to a very limited extent. Discrimination of proportion, of tone, mass and color are necessary to all of the applied arts. Every tradesman must think in terms of the materials of his trade. The power to visualize in these terms is essential. No workman can reach a high order of ability in his trade until he can conceive the materials taking form.

Is he to acquire this ability only by attacking the materials without preconception, or is he to use some means of expression in advance of execution to formulate his ideas? Drawing is universally used as a preliminary to execution. It is idle to attempt to work directly in material and expect to get adequate results. The able tradesman instinctively uses his pencil in devising his work.

Herein lies one of the weaknesses of our manual training as it has been conducted. Students have been given fully devised schemes, and have executed second-hand impressions, with the consequent loss of conception of fitness, purpose, or design.

Teachers have been on a still hunt for ready-made exercises which could be presented to classes for execution with the least possible friction, and with the greatest possibilities for exhibition.

These teachers could not *draw*. Consequently they could not *design*. They had no use for drawing or design under such methods. Drawing to instill appreciation and drawing to facilitate execution is not so different, as those who do not acquire either, would presume.

The proper teaching of drawing is a continual process of impressing the interrelation of parts, whether the purpose is appreciation or execution. Good pictures, no less than good constructions, do not happen to be good; they are designed. They are the result of much experiment, adjustment, and thought.

Drawing should be very close to design in method and result. Contrary to a prevalent idea, drawing, properly taught, is not primarily directed toward a clearer perception of detail or to manual dexterity. A minute description, whether verbal or pictorial, does not result from, or impart, a large unified conception.

The difficult problem in any drawing or design is to keep the large relations in mind. We are all prone to "strain at a gnat, and swallow a camel".

The drawing teacher's time should be largely occupied in leading pupils to see and adjust general effects thoughtfully and carefully.

May we not conclude that *not enough time* is spent on drawing of this kind however much is spent on pictorial reproduction under the name of Art?

ORGANIZATIONS.

ONE of the greatest privileges and, at the same time, one of the most important duties a teacher has is the matter of attendance upon meetings of organizations that have to do with the work in which the teacher is engaged. The attitude of teachers toward such associations is very often an index of their efficiency.

Just now, when the terms, the purposes, the courses, and the results of industrial arts work are being restated and readjusted, how important it is that teachers of these lines of work should meet each other for discussion and conference.

It is decidedly worth one's while to become identified with helpful organizations in such a way as to become an integral and essential part of them. Organiza-

tions are quick to note the faithful ones—those who stand by and help to bear some of the burdens. When one thinks of certain associations, one immediately associates with them, certain individuals who have been active, helpful, and dependable without being officious. So, when one speaks of certain meetings, one says "Mr. A. will be there. Miss B. never fails. It would seem odd indeed without Mr. C."

Good things are said at all meetings. Educational and commercial exhibits are there. New points of view may be gotten. Standards may be established, errors may be rectified, and above all, inspiration may be received.

Not long ago, in speaking of an association, a teacher said, "I can't very well afford to go—and then I can't at all afford *not* to go." And this is the feeling of a large number of teachers who plan from year to year regular attendance on certain important meetings, and, of course, when worthy things are being done, these teachers are usually found in the very front of the movement.

A PRACTICAL METHOD OF KEEPING CHILDREN IN SCHOOL.

A number of powerful commercial organizations have made investigations and published reports dealing with the subject of industrial education. Nearly every one of these reports dwells at some length on the large percentage of the students who do not complete the elementary schools.

Among the organizations making these investigations are the following: The Chicago Commercial Association has twice sent an investigator to Europe to study the question; the United States Chamber of Commerce has recently sent a representative thru the southern and western states; the National Typothetae of America has recently published a report on apprenticeship; the National Association of Manufacturers have published several bulletins; the National Association of Corporation Schools has been organized; the National Retail Dry Goods Association has recently published a bulletin on the subject of Vocational Education.

If these associations are all sincere in their efforts to promote education, they can very readily cause the children to attend school a longer period by refusing to employ any child who has not completed the elementary school, or the high school if they wish. The children leave school because they can find employment. If a certificate of graduation from the elementary school was a pre-requisite of employment, the children would make an effort to attain that certificate instead of waiting for their fourteenth birthday to release them from school.

MORE DEFINITIONS.

At a conference conducted by the National Society for the Promotion of Industrial Education, at Staten Island, December 12th and 13th, 1913, a Committee on Nomenclature defined the term Industrial Arts as follows: "Practical arts, or industrial arts, is a part of general education consisting of series of activity experiences carried on thru the medium of handwork (including manual training, shopwork, drawing, school and home gardening, household arts), designed to assist the individual to an appreciation of the means and methods by which society accomplishes its work. In the later stages of this process (as the individual approaches adolescence) this work becomes prevocational education, in that it may serve to assist the individual to define a vocational purpose in life, by affording a basis for an intelligent choice thru the variety of experiences offered."

As editors of the Industrial-Arts Magazine, we are interested in the interpretation which our readers place upon the term Industrial Arts. We feel that the above definition is entirely too narrow for so broad a term, and in our field of activity do not intend to be so restricted. Webster defines Art as "the application of knowledge or power to practical purposes; the method of doing well some special work; the systematic application of knowledge or skill in effecting a desired result." One could not well define Industrial as meaning other than "of or pertaining to industry." Combining these two, will give one a fairly good definition of Industrial Arts.

Locomotive building, bricklaying, glass blowing, blacksmithing, woodwork, jewelry work, pottery making, drafting, painting, are all industrial arts, yet none of them could be said to fulfill the definition given by the committee.

CHANGE THE ELEMENTARY COURSE.

In the March number of the Elementary School Teacher, Dr. Leonard P. Ayres, of the Russell Sage Foundation, gives the results of a study including 22,027 13-year-old boys in 78 city school systems. One statement made by Dr. Ayres is especially significant. He states: "The lesson of these figures is that in many cities the problem of securing a reasonably complete elementary schooling for all the children is far more pressing than that of instituting specialized industrial training."

Every comprehensive investigation or survey of the school system demonstrates that the greatest need of change exists in the elementary school. To remedy the defect, a course is usually added to the high-school curriculum. We regard the "regular" course in the upper grammer grades as sacred and not to be tampered with.

The physicians have learned that the best medicine is prevention. When medical men make a survey of a city and find that there is an epidemic of typhoid, they do not recommend new and larger hospitals and cemeteries; they recommend that the *source* of the typhoid be purified. We are beginning to consider it a disgrace to a city to have an epidemic of typhoid.

We should apply the same commonsense methods to our schools. When a survey demonstrates that fifty per cent of the children are leaving the elementary school without completing the seventh grade, and are entering low skilled industries, we should go to work at the source, which is the elementary school course.

ITEMS OF INTEREST

THE OHIO SCHOOL SURVEY.

THE Report of the Ohio State School Survey Commission is a volume of 375 pages. It covers the entire field from the office of State Superintendent of Public Instruction to the one-room country school. The spirit of the Commission and its survey is shown by the following extract from the introduction:

"The commission has not been concerned in this study so much with the standing of Ohio in comparison with other states as with her standing in relation to her great possibilities. Wherever actual conditions were found which fall short of the best now possible for Ohio, these conditions have been set forth, even tho in these respects Ohio stands well among the sisterhood of states. The commission has inquired not only 'Is this good?' but 'Might this be improved and how?'"

Acting on the suggestions of the Survey Commission, the Legislature of Ohio, in its last session, enacted a number of laws affecting the schools of the state. Those dealing directly with the Industrial Arts in the schools are as follows:

"Agriculture shall hereafter be taught in all the common schools of all village and rural school districts of the state of Ohio, which are supported in whole or in part by the state, and may be taught in city school districts at the option of the board of education.

"The state shall be divided into four agricultural districts to be mapped out, located and defined by the superintendent of public instruction. Such agricultural districts shall be made up and composed of counties which are contiguous and no county shall be divided in the laying out of such districts.

"The superintendent of public instruction shall superintend all agricultural education in the common schools of Ohio and shall appoint in each agricultural district, so mapped out and designated by him, a person who shall possess all the qualifications of a county superintendent, to be known as a district supervisor of agricultural education.

What Constitutes Consolidated Elementary School of First Grade.

"Each consolidated school in any village or rural school district which shall fulfill the requirements of this section shall be considered a consolidated elementary school of the first grade. Such requirements are as follows:

(a) "Clean building and yard.

(b) "Building in good repair.

(c) "Separate screened privies for each sex, or inside toilets.

(d) "A case of not less than six maps including a map of Ohio.

(e) "Library of not less than 150 volumes.

(f) "100 square feet of slate or composition blackboard. The lower margin of not less than twelve lineal feet of which board, shall be within two feet of the floor.

(f) "A system of heating with ventilation—minimum a jacketed stove.

(h) "Buildings hereafter constructed to have at least three acres of land in connection with each school one for agriculture and school garden purposes.

(i) "Three rooms and three teachers or more on full time, one teacher to have at least a three-year certificate.

(j) "A course in domestic science.

(k) "Two teachers to be employed for ten months each, one teaching agriculture during the school term and to supervise agriculture during part of the vacation. The other to teach domestic science during the school term and to supervise domestic science instruction during part of the vacation.

(l) "Agricultural and domestic science apparatus to the value of at least one hundred dollars.

Additional State Aid For Schools of Grade.

"Each school district in which such schools are located, shall receive from the state treasury the sum of one hundred dollars per annum for each consolidated school of the first grade. Such sums shall be in addition to the regular apportionment of the common school funds and the amounts paid by the state as aid to weak districts. Should the appropriation for any year be insufficient to meet these payments the amount shall be pro rated between the various school districts.

Work Certificates.

"An age and grade certificate shall be approved only by the superintendent of schools . . . . upon satisfactory proof that such child, if a male, is over 15 years of age or, if a female, is over 16 years of age and that such child has been examined and passed a satisfactory sixth-grade test, if a male, a seventh grade test, if a female, in the studies enumerated in section 7762 provided that residents of other states who work in Ohio must qualify as aforesaid with the proper school authority in the school district in which the establishment is located . . . .

"The superintendent of schools or other persons authorized to issue employment certificates shall transmit between the first and tenth days of each month, to the office of the industrial commission, upon blanks to be furnished by it, a list of the names of the children to whom certificates have been issued, returned or refused. Such lists shall give the name and address of the prospective employer and the nature of the occupation the child intends to engage in.

"Any child between 15 and 16 years of age, who shall cease to work for any cause whatever, shall report the fact and cause at once to the superintendent of schools; or to a person authorized by him or, in case there is a vacancy in the office of superintendent, to the clerk of the board of education; said child shall be required to return to school within two weeks, provided other employment is not secured within such time; provided that, should the child in the opinion of the superintendent or person acting in his stead, lose his employment by reason of persistent, wilful misconduct or continuous inconstancy, he may be placed in school until the close of the current school year.

"The superintendent of schools or the person authorized by him to issue age and schooling certificates, shall not issue such certificates until he has received, examined, approved and filed the following papers duly executed.

"The written pledge or promise of the person, partnership, or corporation to legally employ the child, also the written agreement to return to the superintendent of schools or to the person authorized by him to issue such certificates, the age and schooling certificate of the child within two days from the date of the child's withdrawal or dismissal from the service of the person, partnership, or corporation, giving the reason for such withdrawal or dismissal.

"The school record of such child, properly filled out and signed by the principal or other person in charge of the school which such child last attended, giving the name, age, address, standing in studies enumerated in section seven thousand seven hundred and sixty-two, and the number of weeks attendance in school during the school year previous to applying for such school record, and general conduct.

"A certificate from the school physician or if there should be none, of the board of health . . . . that the child is physically fit to be employed in any of the occupa-

tions permitted by law for a child between 15 and 16 years of age . . . .

"The superintendent or person authorized by him may issue special vacation certificates to boys under 16 years of age and girls under 18 years of age, which shall entitle the holder thereof to be employed during vacation in occupations not forbidden by law to such children even tho such child may not have completed the sixth grade, but provided he has complied with all the other requirements for obtaining the certificate hereinbefore described."

CREDIT FOR HOME WORK.

CREDIT for home work in a diversity of practical pursuits is provided in a new plan recently adopted by the board of education of St. Cloud, Minn.

The aim of the new plan is to unite the home and the school in order to connect the work of the school with the activities taking place on the outside, and to encourage the children to spend a part of their time in some useful occupation. Credits are not given in lieu of any of the essential subjects in the school curriculum but a strong academic education is required.

Sixteen units are required for graduation, at least fifteen of which must be regular school credits. For graduation with credit, seventeen units are necessary, two of which must be for home or continuation work and for honorary graduation, eighteen units are required. Three of these may be for home or continuation work.

A partial list of outside tasks, for which credit will be given, is as follows:

"Granite or paving block cutting or work in any of the local trades, shops, factories, or industries, ¼ unit for each summer vacation.

"Steady work on a farm, followed by satisfactory essay on some agricultural subject, ¼ unit for three months.

"Running a split road drag or doing other forms of road building for three months, ¼ unit.

"Judging, with a degree of accuracy, the different types of horses, cattle and hogs, ¼ unit.

"China painting, oil painting, crayon, burnt wood, art, needle, or other handicraft or home decoration work, with exhibit, ¼ unit.

"Three months' employment in a dress-making establishment, ¼ unit.

"Three months' employment as nurse, ¼ unit.

"Making a canoe or boat.

"Installing three or more electrical conveniences in your mother's home.

"Taking sole care of an automobile for one season.

"Preparing one meal alone daily for three months.

"Cooking meat and eggs three ways and making three kinds of cake."

"Students in the high school who shingle the house or paint the barn, swim 300 feet, make the beds every day for three months, sleep for one year in the open air or with open window, take weekly piano, violin, coronet, pipe organ or voice lessons, raise one-fourth of an acre of onions or other specified garden truck, clerk in a store or do any of a number of other things in the home or outside the school, will receive credit toward graduation.

A CO-OPERATIVE COURSE.

A CO-OPERATIVE plan of teaching household arts to girls in the public schools has recently been put into operation at Holly, Colo. Girl students in the high school are divided into small groups for the sake of convenience. Each of the divisions meets once or twice each week at the various homes of the city, where under the supervision of the teacher and mistress, the girls cook, sew and perform household duties in a systematic and practical manner.

A part of the course is devoted to preparing and serving of lunches with a limited amount of money. A number of girls are designated for the work and criticisms are made on the method used, the conversation and manners of the guests and other important details.

The advantages claimed for the idea are that it is inexpensive, that the girls learn to cook and do housework in the home with the equipment and material to be found there and that the variety of knowledge and use of materials serves to broaden their education along this line. They also come in contact with the experts in the various localities where they learn the recipes and methods advocated by these housewives.

STANDARD DIMENSIONS OF FURNITURE.

THE following Standard Dimensions of Furniture are used with great success by Mr. Schillinger of the Junior High School of Grand Rapids, in his furniture-making classes.

	Height	Width	Depth
Dining Chair	Seat 18", Back 23"-24" from Seat	Seat 18", Front 12½" Back	Seat 17"

Back 14" wide at top, 3" slant, draw as if straight.

Arm Chair, back 1½" higher, 1½" wider over all, seat 18" deep, arms 9" from seat, arms 14" long.

Davenport (Example)	Arms 27". Back 40"	78"	30" Over all
Taboret	16"	14"-16"	14"-16"
Tables (Parlor)	30"	18"-24"-20"	18"-24"-24" (Resp.)
Tables (Library)	30"	26"-28"-30"	40"-48"-54" (Resp.)
Tables (Extension)	29" without casters	44"-48"-54"-60"	

Top ⅞" thick. Rim 3"-4". Leg 18" from center of table.

Pedestals	36"-42"	12"-14"	12"-14"

Column 6".

Bed	54" (Standard between side rails)		
Dresser Base	33"	40"-60"	22"

Allow 1/16" between frames for easy sliding of drawers.
Make drawers in even inches.
Allow ⅝" for heft of glass in mirror.
Common sizes of glass—22"x28", 24"x30", 28"x34", 28"x36", 34"x36", 36"x40".

Chiffoniers (Base)	48"	32"-44"	18"-20"

Mostly 5 Drawers. Mirror, fair size, 14"x24".

Washstand (Base)	28"	34"-36"-38"-40"	19"

Towel spindle, 22" from top of base.

Music Cabinet	30"-40" (40" usually)	24"	18"

Music 14"x11".
Ladies' Writing Desk, vary in width and height.

Writing Base	28" (Standard)	30"-40"	15" Base, 17" Top (Example)
Serving Table	38"	42"	20"

Drawer 4" high, Shelf 13" from floor.

Buffet	38"	42" (Example)	22"

Glass in Example 16"x30".
Top Drawer 5", Door 18"x14", Wine Drawer 16"x18".

Sideboard (Base)	36"-38"	44"-72"	20"-26"

Top Shelf generally 27" above base.

Example	38"	50"	24"

Top Drawer 6", Linen Drawer 8", Door 15" high, Pilaster Leg 3" wide. Column supporting top shelf 2¾" Diameter, 4½" widest point. Glass 16"x34", Top Shelf 10" deep.

China Closet	56"-72"	36"-48" Widest Point	9"-10"

Sizes according to sizes of glass.

Example—Center glass 20"x52", Turned column 3" thick, Beat glass 9" Radius, Complete height 65", Width 54", Depth 13", Measured on top, 1½" Door and glass frame. Lighter cabinets, lighter frames.

Bookcase	Vary with Design	38"-48"	9"-10"
Example	60"	42"	15" Greatest d.

Glass in Example 14"x48", Column 2¾", Door frame 1½".

Morris Chair.

Example—Width between posts 20", Leg 3" sq., Height to bottom of arm line 21½", Arm 1¼" thick, Height to top of front rail 12", Arm 33" long. Measurements vary 1" to 2".

Hall Clock (Average)	6' 6"	18"-24"	
Wardrobe	Governed by w.	36"x56"	12"
Example	92"	46" across posts	15" inside
Mission Chair	Seat 18", Back 21" from seat	Front 18", Back 15".	15" inside 18"

Back legs about 1" shorter than front.

Rocker, averages 19½" between posts in front, 15½" in back at seat line, 17½" between Posts at Top, Seat 20" deep, Back 28" high from seat, Seat Rail 10½" high, Arms 22½" from floor, Slant of back leg 4". Back Leg ½" shorter than front.

INDUSTRIAL ARTS IN FALMOUTH, MASS.

FALMOUTH, MASSACHUSETTS, is strictly a summer resort. The situation here is rather peculiar as there are practically no industries or factories of any kind here. Therefore the boys have had almost no opportunity for any industrial training.

In September, 1913, domestic science and manual training departments were started in the schools here. From the first day, the boys in the manual training department have been very enthusiastic in the work, some of them even working after school and evenings. The town appropriated fifteen hundred dollars to equip the two departments. Five hundred seventy-five of this was used for the manual training department. We purchased fifteen splendid benches, with side and tail vises; also tools, paint stock and over one thousand feet of assorted lumber. We have a very fine equipment for the small amount of money spent.

We built our tool closets, also a lumber rack, a heavy bench for the iron vise and tool grinder, a table for our mitre box, a cabinet for the "first aid to the injured" outfit, a table for the glue heater, etc. We have made many repairs in the school building, including re-glueing, re-finishing and re-caning of chairs. We have repaired broken windows and desks. In concrete work, we took the boys to the schoolhouses in the outlying districts, and built four sets of concrete steps thereby giving them actual experience in that work. The boys have helped install electric lights in the high school building. They took up the floors, bored holes in the floor joists, run the wires and replaced the floors. For the domestic science department, we built a large pantry, shellacing the woodwork and painting the walls of same. We bronzed the pipes in the kitchen. For the sewing room, we made a large cabinet. We have also made many other things for other departments in the school, too numerous to mention. These include bulletin boards, report-card boxes, etc.

We have saved for the town in repairs, new work, etc., between two hundred fifty and three hundred dollars, in the six months that the department has been running, —a very creditable showing for a new department. We have not attempted to keep to a narrow course of study. We have looked first to see what needed to be done, and second to see what particular work was best for each individual boy.

Milan G. Twitchell, Supervisor of Manual Arts.

STUDENTS PURCHASE PRESS.

THE students of the Manual Arts High School of Los Angeles, California, have purchased a $2,400 cylinder press with funds earned thru student activities. The press will be used for outside work, which is solicited

Example of Students Work.

the same as is done by a printing establishment, and for the printing of programs, blanks, forms, school magazines, etc., which are used by the different departments of the school.

Thirty students are now taking the course in printing, which requires three years for completion. The semi-annual school magazine is edited, printed, and published entirely by the student body. One-half of the salary of the instructor of printing is paid by the student body, the other half being furnished by the Board of Education. The printing jobs clear about $20 per month and the printing of the student magazine, alone, saves the students a bill of almost $300 each semester.

Printing Press of the Manual Arts High School, Los Angeles.

The Student Body Organization is quite highly organized financially and does a business totaling about $40,000 per year, sometimes clearing in a half year $800 to $2,000 for the Student Body. These profits are invested in various improvements which cannot be furnished by the Board of Education, such as a new curtain recently purchased for the auditorium stage costing $800, and the re-equipment of the school cafeteria at a cost of $1,200. The school cafeteria, candy stand, ice cream stand, book store, and print shop are all owned and operated by the Student Body Organization thru committees or elected managers under some faculty supervision.

The auditorium has from two to four pay entertainments per month given by students or organizations from which as much as $300 or $400 are sometimes derived. These profits are all turned into the general fund and devoted to improvements and investments such as have been described. The athletic field is renovated once or twice each season, furniture and equipment for Student Body offices are bought, and bleachers seating 2,500 people have been bought thru the student organization.

SCHOOL CREDIT GIVEN FOR HOME WORK IN HOUSEHOLD ARTS.

Provisions for home work with credit have been made by the Home Economic Department of the Public Schools of Ames, Iowa.

A bulletin issued by Supt. F. W. Hicks regarding the plan is as follows:

In a sense, Home Economics is new in the school course. That it is essential, no one can doubt. Unless the work is vitalized, unless it is made to relate and to connect with the work in the home it loses much of its vitality. Our aim is to relate the home and the school and permit each to contribute its share in making the work really worth while.

1. Purpose of home-school work: The purpose of giving school credit for home work is to bring the school and home into closer relation. We hope it may prove an incentive for the girl to do, at home, some of the things she has learned at school. In this way she may carry into the home some new ways of working, and there will

be an exchange of ideas between mother and daughter as to hows and whys of so doing that will result beneficially to both. As the girl carries these ideas and discoveries back into the school we shall be able to know better the needs of her home and social life, and hence to so plan our work that it may "carry over" into her out-of-school life.

To be successful this home-school work requires the best interest and co-operation of the girl's family. This interest and co-operation we ask for in order that the school may closely meet the needs of the child.

2. A total of two credits may be earned by home work in Home Economics. These credits will apply on high-school graduation. Three hundred points equals one credit.

3. Fractional credit will be given for part work.

4. Enough work must be done to make one credit in order to have the work apply on high-school graduation.

5. The work may extend thruout the student's four-year high-school course.

6. General work should be reported each month; records kept each week.

7. A grade of 75 or "fair," is necessary for credit.

Cookery.

1. Total for cookery two-third credit—200 points.

2. In each case the family recipe must be used (enough to serve six) and whenever possible a samp'e of the product brought to school for examination.

3. The recipes stating method, and giving itemized cost, together with a statement from the guardian or parent saying the entire work was done by the girl, must accompany each dish brought in. Blanks will be provided for this.

Grading is to be made on the following basis: (a) Appearance of the finished product, (b) Taste, (c) Texture. In grading bread or cake the score card given to the class will be used, and product brought to school and marked by the teacher.

5. One-third credit—100 points, open to girls who are taking, or who have completed first year cookery. Fifteen of the following dishes are to be made: the ten starred are required; the other five may be chosen from the list.

Some fresh vegetable cooked and served in a white sauce.

Potatoes in some form.
Tapioca.
Rice.
Macaroni.
Muffins.
*Baking powder biscuit.
*Plain cake, with or without frosting.
*Drop cookies.
*Rolled cookies.
*Pastry.
*Gelatine with soft custard.
Cottage cheese.
Scalloped dish.

Custard, or some kind of custard pudding (bread, rice, tapioca).

Steamed brown bread.

*(Prune whip) (Marquerites) One of these required, other may be chosen.

Fondant candies.

Salad with cooked or French dressing.

*Sandwiches—three kinds of filling.

*Bread.

*Baked beans.

The starred dishes, each receive seven points credit. Each chosen dish receives six points credit.

6. One-third credit—100 points. Open to girls who are taking, or who have completed second-year cookery. Fifteen of the following dishes are to be made; the ten starred are required; the other five may be chosen from the list.

*(Canned fruit, preserves) One of these required, other may be chosen.

Pickles.

*Jelly.

*Bread.

*Parker House rolls.

*Sponge or angel cake.

Salad with mayonnaise served with some made salad wafer.

*Cocking two fresh vegetables.

*Roast meat.

Broiled steak.

*Breaded chop.

Meat stew with dumplings.

*Meat substitutes—one dish required, one dish may be chosen.

Creamed soups.

Two left-over dishes. Tell what you would serve with this dish to make a good luncheon or supper dish for your family.

Frozen dessert.

*Light dessert.

*Heavy dessert.

Boiled dinner.

The starred dishes each receive seven points credit; each chosen dish receive six points credit.

General.

1. Total for general housework two-thirds credit—200 points.

2. This is to be carried on eight months for one-third credit—100 points.

3. This work carried on for 16 months will give two-thirds credit—200 points.

4. Work—

1. Making girl's own bed each day, three points for four weeks.

2. Daily and weekly care of one bedroom, preferably girl's own room, four and one-half points for four weeks.

3. Helping with general housework one-half hour each day (sweeping, dusting, ironing, washing dishes, washing windows, etc.), three points for four weeks.

4. Helping with general housework one hour on Saturday, two points for four weeks.

5. Total credits for general work twelve and one-half points for one month. One task must be done for four weeks in order to get any credit.

Sewing.

1. Total for sewing two-thirds credit—200 points.

2. Any work may be chosen and credit will be given up to 200 points.

3. One-third credit—100 points, open to girls who are taking, or who have completed first-year sewing.

Night gown	50 points
Drawers	50 points
Corset cover	50 points
Chemise	50 points
Underskirt	50 points
Darning	25 points
Mending	25 points
Child's apron	25 points
Child's dress	50 points

4. One-third credit—100 points, open to girls who are taking, or who have completed first-year sewing.

Princess slip	50 points
House dress	75 points
Shirtwaist	50 points
Woolen skirt	75 points
Made-over dress	75 points
Nice dress	100 points

5. In all sewing the finished article is to be brought to school for examination, and it will be graded according to score cards used in the class. Girls have score cards in their note books, or they may be procured from teacher.

6. Additional sewing and hand work may be done by arrangement with teacher, who will decide points to be given for work.

BOOK REVIEWS

Furniture Design for Schools and Shops.

By Fred D. Crawshaw. 132 pages. Price, $1.00, postpaid. The Manual Arts Press, Peoria, Ill.

This is a companion volume to Prof. Crawshaw's former work, Problems in Furniture Making. It is an unusually suggestive addition to the literature of furniture making. It emphasizes the great possibilities in simple furniture design and seeks to stimulate originality and initiative.

The arrangement is unique. As an example, in the chapter devoted to taborets and low pedestals, there are nine perspective sketches of taborets and pedestals, and with each sketch there are a number of variations, making in this chapter fifty-two possible designs. The sketches are undimensioned and details of construction are omitted, leaving these for the ingenuity of the maker.

The problems are given in twelve groups as follows: Taborets and low pedestals, stools and small seats, umbrella racks, book shelves, wall cabinets, screens, seats and chests, small tables, writing and serving tables, large tables, costumers, and chairs. The appendix gives the average sizes of furniture as constructed in commercial shops.

This book will be a source of inspiration and suggestive help for teachers, students, and cabinet makers.

Elementary Agriculture.

By William Lewis Nida. 238 pages. A. Flanagan Co., Chicago.

The call for Agriculture in the schools has been so insistent that many teachers have had to undertake the work of teaching the subject without sufficient preparation. Hence, there has been a demand for a teacher's book containing a very simple and clear account of the essentials of Agriculture. Mr. Nida has supplied such a book. It is filled with very brief, concise information which is being sought by teachers, farmers, and boys and girls alike.

An interesting part of this volume is the Appendix, which consists of "One-thousand Questions Answered." In this, very sane, practical questions are answered in a sane and practical way.

A very full and complete index puts the information of the text at the immediate use of those who need it. The book is fully illustrated, exceptionally well printed on excellent paper, and strongly and tastefully bound.

Farm Accounts.

By Chester W. Smith and S. M. Thomas. 82 pages. Price, postpaid, 30 cents. Laurel Book Co., Chicago.

This little book emphasizes the need of proper business methods and forms among the farmers of today. It supplies an abundance of practical problems based upon actual transactions and market conditions.

The authors suggest the book not as a separate study, but as a substitute for certain parts of Arithmetic, such as Exchange, True Discount, Partial Payments, and Cube Root. Especially for the rural schools, the suggestion is a wise one and should find a ready response.

Art Education.

By Henry Turner Bailey. Price, $0.60. Houghton Mifflin Co., New York, Chicago.

Mr. Bailey first states in this little book the purpose of art education under seven factors: The School Estate; The Schoolroom; School Housekeeping; School Costume; School Work; Specific Instruction and The Teacher gives definite methods of work which reflect his remarkable experience in the field of art education.

Every teacher of art in the schools should have this book as a convenient measure of standards.

With Pen and Ink.

By James Hall. 80 pages. The Prang Company, New York, Chicago, Boston.

A series of 21 exercises in pen and ink drawing are presented in this book with explanation and illustrations covering a variety of kinds of rendering.

The element of design predominates over the pictorial and makes the book unique among texts on pen drawing.

This emphasis on design also reflects the prevailing need of instruction in pen drawing as it is given in high schools.

Pen illustration is a difficult art and is also a most attractive one to pupils.

The attention given to the arrangement of masses and lines in Mr. Hall's text is the result of his long experience as a teacher and draughtsman in which he has recognized composition as an essential in the instruction of pictorial art.

The exercises are progressive in sequence with the decorative treatments preceding the more pictorial and should be of decided help in presenting this subject in the schools.

Vocational Guidance.

By J. Adams Puffer. Cloth, 294 pages. Price, $1.25. Rand, McNally & Company, Chicago, New York, London.

In this book, the author discusses the needs and possibilities of Vocational Guidance from the standpoint of the child who is to go to work at an early age. He believes that the proper person to advise and counsel the child is his teacher. He gives the teacher the information concerning various types of vocations which will enable her to give good advice and wise counsel.

The book is profusely illustrated with photographs of people at work in various industries. The text is very practical and is full of common-sense suggestions and information. Every elementary school teacher and every teacher of Industrial Arts who endeavors or hopes to influence the careers of his pupils, should read this book.

The appendix consists of a condensed report of occupations of persons in the United States, compiled from the report of the census of 1910.

Garment Construction in Schools.

By Ada Hicks. 184 pages. Price, $1.10. The Macmillan Company, New York, N. Y.

It is obvious that this book is the result of personal experience as a teacher of sewing in the elementary schools. The author is Head Mistress of the Manor Road Council School, West Ham E., London. The work outlined is intended for elementary school girls from 8 to 14 years of age.

The work is altogether practical. Patterns are given for night dresses, chemises, knickers, combinations, camisoles, petticoats, skirts, aprons, sleeve guards, pinafores, overalls, and blouses. The patterns are so given that they can be made to fit any child. They are shown laid out on paper which is marked off in one inch squares. The necessary material and the method of making is stated with each problem. The book is fully illustrated with photographs of the completed garments.

There is a chapter on the use of the machine, two chapters on cutting out, and a chapter on typical faults of children and how to correct them. The book will be welcomed by teachers of sewing in both elementary and high schools.

Mechanical and Constructive Drawing.

Eighty-four pages. Price, 25 cents. The Prang Co., New York, Chicago, Boston.

Instruction is given in this text on the choice and use of materials for constructive drawing. A series of 21 geometrical problems of particular application in mechanical drawing are described and illustrated. Definitions of the various geometrical forms of mechanical and constructive drawing are stated and illustrated. The con-

ventions of working drawings are described and various exercises are explained showing the revolutions from plan to elevation.

Freehand constructive drawing is explained; the various joints in wood illustrated and exercises in freehand working drawings of wooden models given with explanation and illustration.

The theory of orthographic projection, cutting planes, intersections, the development of surfaces and machine details with notes on tracing and blue printing complete the text.

Some Suggestive Features of the Swiss School System.

Bulletin No. 56, 1913. By William Knox Tate, State Supervisor of Elementary Rural Schools, of South Carolina. 115 pages of text and 26 pages of illustrations.

A very complete description, giving just the information concerning the Swiss Schools which an American teacher desires. Approximately 35 pages are devoted to the Swiss system of vocational training.

A System of Farm Cost Accounting.

By C. E. Ladd, Agent, Office of Farm Management, United States Department of Agriculture. Farmers' Bulletin No. 572.

Water Supply, Plumbing and Sewage Disposal for Country Homes.

By Robert W. Trullinger, rural engineer, Office of Experiment Stations. Bulletin of the United States Department of Agriculture No. 57.

NEWS AND NOTES

THE MANUAL TRAINING CLUB of the State Normal School in Bellingham, Wash., publish a monthly paper which they have named "The Buzz Saw." The type is set and the paper printed by students in the printing classes. The January issue was largely devoted to the subject of manual and industrial training.

"The Lathrop Industralist" is the name of the school paper edited and printed by students of the Lathrop Industrial School of Kansas City. It is on the order of a newspaper and contains items of interest to the boys and girls as well as to older persons interested in schools of this character.

EUGENE, ORE. The students of the carpenter class in the Manual Training Department of the high school will construct the new addition to the manual training building. The work of the students will result in a saving of over $250 to the schools and will make possible the enlargement of the quarters for these classes. The school board has contracted for the purchase of new equipment to the value of $1,100. This includes lathes, a saw table, planer and jointer.

WICHITA, KANS. Courses in elementary science and household chemistry have been in operation in the high school during the year just passed. The study of these subjects was undertaken without the aid of textbooks and next year is to be extended by the introduction of cooking. The course, as outlined, has a foundation of inorganic chemistry, a small amount of organic chemistry and applications of physiology and hygiene as well as quantitative analysis of some of the simpler household compounds.

THE SENIOR CLASS of the Massachusetts Normal School of Art is engaged in a competition for a series of seven large and fourteen small panels to be applied as a frieze to the walls of the Prince Elementary School auditorium. The subject of the paintings will be Aesop's fables.

LECTURES on occupations for 8th and 9th grade boys and girls have been arranged in the Williamsport schools. The lectures for the girls will be on domestic science, domestic arts, and occupations for women in general. Lectures to boys will be on printing trades, metal working and wood working trades. The lectures will be delivered by business men who are actively engaged in the lines of work. Supt. Lose is also making a study of the boys and girls employed in the different establishments of his city. Employers have been quite willing to answer the questions sent out and show their readiness to co-operate in providing educational opportunities to their employees who were early deprived of school privileges.

STUDENTS at the Technical high school, Buffalo, have been working for some time turning out furniture, and several thousand dollars' worth have been made for use in the new city high schools now under construction.

ST. LOUIS, MO. A night class in carriage, wagon and automobile draughting has been opened at the Central High School with an initial enrollment of 45 students. The school is the first of its kind in the United States and has been opened for the benefit of employes in various branches of the vehicle industry who desire to perfect their work. Sessions are held three nights each week.

AT a recent meeting held in Evanston, Ill., an Industrial Arts Club was organized. Some fifteen or more were present at the urgent call of T. L. Adams, the live Manual Training Supervisor of Evanston.

This Club will be known as the North Shore Industrial Arts Club. Its membership includes the Manual Training, Domestic Arts and Science teachers of both elementary and high schools extending from Evanston to Waukegan, Ill. The following officers were elected: Mr. T. L. Adams, Haven School, Evanston, Ill., President; Mr. Bernard Berg, Central School, Waukegan, Ill., Vice-President; Miss F. Elizabeth Burt, Haven School, Evanston, Ill., Secretary and Treasurer.

TOLEDO O. Under the direction of one of the students who has had considerable experience in government service, a wireless station has been installed at the Central high school. In addition to the study of wireless systems, the students will be treated to lectures on navigation and scientific subjects by experts in those lines.

JOHNSTOWN, PA. At a recent meeting of the school officials and representatives of local industries, favorable action was taken for the introduction of the co-operative industrial plan in the public schools. The plan is similar to that adopted at Fitchburg, Mass., and is conducted on the turnabout method of giving boys industrial or trade apprenticeship training in connection with school work. Manufacturers and business men will co-operate with the school authorities in providing places for boys who desire to learn certain trades while in attendance at school.

It is believed the wages for the first year will be necessarily low, about ten cents each hour, but will be increased during succeeding years.

ST. LOUIS, MO. The school board has made provision for the extension of school garden work by the appointment of a special instructor and supervisor and the introduction of the subject of flower culture.

CHAMPAIGN, ILL. The students of the household science department of the high school, during the second

semester, have been engaged in a study of linen manufacturing. Each student made an underskirt of the material.

MESA, ARIZ. With a view of teaching the boys in the high school the use of tools, the Manual Training Department has begun a campaign for better and more extended work. Instruction is given in all kinds of repair work and in furniture construction. Picture framing in two kinds of wood is done and orders are solicited from local residents. The work has been arranged in such a manner that the more difficult work is done by the advanced pupils.

PHILADELPHIA, PA. Under the direction of the Director of Domestic Science in elementary grades, a course in purchasing, cooking of food and recording of cost has been inaugurated for the benefit of the girl students in the upper grades. The instruction will include comparisons of prices of home-prepared articles and those contained in cans or bottles. The aim is to train the pupils so that they will not only be able to prepare any dish properly, but will at a glance estimate the cost and in consequence be able to undertake the active management of a home.

SPRINGFIELD, ILL. Laundry work, as a form of vocational education, has been undertaken in one of the public schools.

MOLINE, ILL. The Director of Manual Training has made arrangements for a series of lessons in sign painting to cover six lessons of two hours each. A nominal price is charged for the instruction which includes a copy of a 100-page book on the subject.

THE DIRECTOR of the Boston Museum of Fine Arts has co-operated with the school authorities of the Hub City in providing special opportunities for the students in drawing and Manual Training.

A VOCATIONAL SCHOOL has been opened at Lafayette, Ind., in the remodeled high school building. The school will give opportunity for trade instruction for young men and women who wish to make themselves proficient in their chosen occupations. The first courses to be undertaken are dressmaking and mechanical drawing. In addition there will be special lectures on salesmanship for clerks and those who intend to become clerks. Two classes in each subject have been opened with sessions every evening during the week. An auditorium and lecture room are provided and space in the basement has been reserved for workshops for future use.

KANSAS CITY, MO. An Agricultural class for teachers in the public schools has been organized under the direction of Principal H. H. Holmes of the Central High School. The class has been begun to meet the needs of young and adult citizens who desire scientific knowledge of Agricultural and Horticultural subjects.

CALUMET, MICH. Steps have been taken to broaden the scope of Manual Training and Domestic Science by providing two 90-minute periods per week for boys in the shop, two lessons each week in cooking for eighth-grade students and one each in cooking and sewing for seventh-grade girls.

Students in morning classes are required to report for classes at 8:30 in the forenoon and those in the afternoon classes will remain until 4:30. Additional instructors have been engaged and an entirely new cooking center has been established.

CINCINNATI, O. As a means of economizing in school funds, the school board has adopted a scale of charges for manual training and domestic science supplies used by the pupils in these subjects. Pupils who cannot pay for the material are to be furnished all or a part of the same when it is absolutely necessary.

The charges for material, per year, are as follows:

Manual Training, fifth grade, 30 cents; sixth grade, 40 cents; seventh grade, 50 cents, and eighth grade, 80 cents; high school, all grades, $2. *Domestic science* (cooking), eighth grade, $1; seventh grade and below, 50 cents; (sewing), eighth grade, 20 cents; seventh, sixth and fifth grades, 30 cents. High schools, domestic art: D grade, 30 cents; C grade, 50 cents; domestic science, A grade and B grade, $2; C and D, $1.

BELOIT, WIS. With the opening of the next school year, housekeeping will be taught to girls in the Industrial School. The upper floor of the old high-school building will be converted into a model flat.

DETROIT, MICH. Upon the recommendation of Assistant Superintendent Frank Cody, a vocational school for girls has been opened in the Lincoln school. The students are those who have reached the age of 14 years and who have not made any progress in the regular classes of the schools. The instruction consists of common-school subjects, cooking, needlework and housework. It is planned to open a similar school for boys in the near future.

TRAINING schools for rural teachers have been established in two counties of the state of North Dakota to provide special instruction in Agriculture, Domestic Science, Manual Training and pedagogy.

SAGINAW, MICH. Instruction in Domestic Art, including crocheting, knitting, and embroidering has been inaugurated at the Arthur Hill Trade School. Facilities have also been provided for work in freehand drawing.

LEOMINSTER, MASS. A Domestic Science Department has been opened for the benefit of the public schools. Practical housekeeping will be taught.

CHICAGO NOTES.

THE ELEMENTARY MANUAL TRAINING TEACHERS' CLUB of Chicago has been an active force in manual training in Chicago for several years. It has developed a high sense of professional ethics among its members and has co-operated successfully with the supervisors and city superintendents in meeting the changing conditions of industrial and vocational training.

It has materially assisted in making creditable exhibits of work at the N. E. A. and other associations. It has prepared lists of suitable books both for teachers and pupils; it has taken large delegations to Gary, Joliet, and other centers of successful manual training education; it has held monthly banquets at which prominent men and women have made helpful talks, the last being Supt. Bogan of the Lane Technical High School.

Last year it secured a room in a suite in the Mallers Building, Madison Street and Wabash Ave., as club headquarters. This suite of several rooms, opening into a beautiful central reception room, is managed by the principals' club and here is gathered every important club in school work in Chicago.

The Elementary Manual Training Club has a large case in which educational literature, photographs of manual training work, plans and blueprints of models, also small models and other educational helps for the manual training teacher will be found. The rooms are on the eighteenth floor with a beautiful view of the lake harbor. It is hoped that visiting manual training teachers from other cities will meet with us there for an exchange of views and to form pleasant friendships.

Delegates from the Chicago Club, visited the last meeting of the Manual Arts Association, held in Evanston. The meeting there was under the auspices of Evanston Mothers' Club and the attendance was excellent. A number of the teachers there, and from other North Shore towns, met with us to hear Mr. Bogan and the foundations were thus laid for closer relations between the two clubs.

PREPARATIONS COMPLETE.

THE Committee in charge of the local arrangements for the meeting of the Western Drawing and Manual Training Association in Milwaukee, May 6 to 9, are prepared to care for the largest convention in the history of the Association. The immense arena of the Auditorium has been entirely reserved for the exhibits, and there will be no room to spare. The Milwaukee schools will have an exceptionally fine exhibit. The Boys' and the Girls' Schools of Trades are planning to show the work of all departments in a unique manner.

The prospects are that all records of attendance will be broken. Large delegations will come from all of the larger cities within 300 miles. The Chicago manual training teachers are planning to request that they be allowed Friday to attend the meeting, and intend to engage a special train to carry them. Grand Rapids is planning to send fifty teachers; Kalamazoo intends to send thirty. Reservations are being made for special sleepers from St. Louis to Milwaukee, without change.

The program will afford ample opportunity for discussion. The officers have planned that every meeting shall be on time. Every speaker knows how much time he is to be allowed, and time will be allowed for discussion where the program calls for a discussion.

Program.

Upon invitation, the Wisconsin School Arts and Home Economics Association meets with the W. D. and M. T. Association. All sessions will be held at Kilbourn Hall-Auditorium, unless otherwise stated.

General Topic—A Casting of Accounts Educationally, of the Fine and Industrial Arts.

Wednesday, May 6th.

Registration: Auditorium-Kilbourn Hall.

2:00-5:00 P. M. General Session: Opening Exercises. Music.

Address of Welcome—Hon. Gerhard Bading, Mayor of Milwaukee. G. W. Augustyn, President Board of Education. Milton C. Potter, Superintendent of Schools.

Response and Address of President—R. W. Selvidge.

Business—Appointment of Committees on Resolutions; Place of Meeting; Election of Committee on Nominations.

Inspection of Exhibits—Milwaukee is planning to make the exhibits a special feature of the meeting. Plenty of time should be set aside by the members for their study.

6:00-8:30 P. M. Dinner—Plankinton House.

8:30-10:30 P. M. Entertainment—provided by local members. Plankinton House, Colonial Room.

Thursday, May 7th.

9:00-10:30 A. M.—General Session—Kilbourn Hall. Folk-Dancing.

Address: *Present Day Psychological and Educational Aspects of the Fine and Industrial Arts.* Carroll G. Pearse, President Milwaukee State Normal School.

10:30-12:30 P. M.—Round Tables.

Art Round Table—Kilbourn Hall. Lucy Dorrit Hale, Milwaukee State Normal, Chairman.

Topic: *The Service of Art in the Plan of Education for the Child.* Florence Fitch, Public Schools, Indianapolis.

Topic. The Exhibits: *From the Standpoint of the Child's Environment;* R. W. Himelick, State Normal School, River Falls, Wis.

Discussion: *A general discussion reviewing the exhibits from the standpoint of the Emotional Approach to Art, and from the standpoint of Technique.*

Vocational Round Table: Juneau Hall. Chas. H. Bailey, State Teachers College, Cedar Falls, Iowa, Chairman.

Topic: *Continuation Schools; Shall they be General Improvement Schools or Vocational Schools?* Warren E. Hicks, Inspector of Industrial Education, State of Wisconsin, Madison.

Topic: *The Boy and the Printshop,* S. J. Vaughn, Northern Illinois State Normal School, DeKalb.

Discussion.

3:00-5.30 P. M. Special Session of the Wisconsin School Arts and Home Economics Association, Kilbourn Hall.

1. Business Meeting.

2. Address: *The Fine and Industrial Arts in Wisconsin: What Should the Public Schools Do at This Time in Teaching Them?* President L. D. Harvey, Stout Institute, Menomonie, Wis.

R. W. SELVIDGE.
President Western Drawing and Manual Training Association.

2:00-5:00 P. M.—Inspection of Exhibits. Committee Meetings.

8:15-10:00 P. M.—General Session, Kilbourn Hall. Music, Public School Pupils.

Address: *General vs. Special Education.* A Discussion of the Relationships Between Cultural and Vocational Subjects, H. H. Seerley, President State Teachers College, Cedar Falls, Iowa.

Address: *Revolutions in Art—What the Post-Impressionists and the Cubists are Struggling for,* Dudley Crafts Watson, Director Milwaukee Art Society.

Friday, May 8th.

9:00-10:30 A. M.—General Session, Kilbourn Hall. Music.

Address: *Design in General Education: An Analysis of its Claims and its Accomplishments;* L. D. Harvey, President Stout Institute, Menomonie, Wis.

10:30-12:30 P. M.—Round Tables.

Household Arts, Kilbourn Hall. Dorothy Buss, McKinley High School, St. Louis, Chairman.

Topic: *Aims and Methods in Teaching Household Arts.*

In the Grades, Emma Conley, State Inspector of Domestic Science, Madison, Wis.

In the High School, Flora E. Henke, Hackley Manual Training School, Muskegon, Mich.

In the Trade School, Ora A. Blanchar, Principal Girls' School for Trades, Milwaukee, Wis.

Manual Training Round Table, Juneau Hall. Fred Buxton, Stout Institute, Menomonie, Wis., Chairman.

Topic: *How May Manual Training Contribute to Vocational Preparation?* W. H. Henderson, Public Schools, Hammond, Indiana.

Topic: *How May Manual Training Retain Its Earlier Educational Values?* Chas. A. Bennett, Bradley Polytechnic Institute, Peoria, Ill.

Discussion. Led by F. D. Crawshaw, University of Wisconsin, Madison.

2:00-3:30 P. M. Automobile Ride.

3:30-6:00 P. M.—Visits to Boys' School of Trades, Girls' School of Trades, Milwaukee Art Society, Milwaukee Downer College, Milwaukee State Normal School, Layton Art Gallery.

8:00-10:00 P. M.—General Session, Kilbourn Hall. Folk Dancing, Pupils of Cass Street School.

Address: *Striking the Balance Between Theory and Practice in the Fine Arts;* E. J. Lake, University of Illinois, Urbana.

Address: *The Place of Practical Activities in Education;* Katherine E. Dopp, University of Chicago.

Saturday, May 9th.

9:00-11:00 A. M.—General Session, Juneau Hall. Music. General Business Meeting.

NOW, ARE THERE ANY QUESTIONS?

Readers are urged to ask questions concerning the Industrial Arts. The editors will reply to those questions which they feel that they can answer, and to other questions, they will obtain replies from persons who can answer them authoritatively. Questions should be addressed to THE EDITORS.

Summer School Best.

Vale, Oregon. Q:—I wish to do some work along the line of Industrial Arts. Would you advise me to use some "system," or to attend summer schools?

A:—By all means, attend some good summer school where you will get the inspiration of *real* teachers. There is too much dry, meaningless stuff in the schools without "canned systems."—*S. J. V.*

Bookbinding and Printing.

Hastings, Minn. Q:—Where can I buy simple, inexpensive equipment for elementary Bookbinding?

A:—The Public School Publishing Co., Bloomington, Ill., makes a specialty of supplying just such equipment.—*S. J. V.*

Joliet, Illinois. Q:—What are the proper positions of *fl* and *ffl* in the printer's case?

A:—See February issue Industrial-Arts Magazine, page 67. The *fl* box is the next on the right of *ffi* which is the upper left hand corner box in the lower case. The *ffl* box is the lower right hand corner box of the upper case.

In some copies of the February issue, the *fl* was indistinct, resembling the *fi* whose box is immediately below *ff*. This was probably due to some imperfection in the plate.—*S. J. V.*

Decatur, Illinois. Q:—1. Is a course of Printing better adapted to the elementary than the high school? 2. What will an equipment cost? 3. Is Printing an expensive line of work for the schools?

A:—1. Printing is exceptionally fine work for both grammar and high-school boys. It seems almost indispensable to the best interests of sixth, seventh, and eighth grade boys. 2. A wonderful start can be made with $300 or $400, if it is judiciously spent. Of course, $600 would be a better amount to start the work with in a city like yours. 3. The cost of maintaining courses in Printing is extremely small.—*S. J. V.*

Fort Wayne, Ind. Q:—Will you please tell me a firm that supplies equipment for elementary Bookbinding?

A:—See answer to Hastings, Minn.

La Crosse, Wis. Q:—Where can reliable equipment for Printing be bought?

A:—Buy your Printing equipment from the American Type Founders or Barnhart Bros. & Spindler. Both of these firms have houses in Chicago, New York, and many other cities thruout the country.—*W. H. H.*

El Paso, Texas. Q:—1. About what would be the cost of installing and maintaining a Printing plant in the public schools? 2. Could the grammar grade boys do some of the printing needed by the Board of Education?

A:—1. See answer to Decatur, Illinois. 2. Your seventh and eighth grade boys could print practically everything a Board of Education could use and a lot more besides.—*S. J. V.*

Manual Arts Report.

Vermilion, S. D. Q:—Where may I obtain copies of the Reports of the Illinois Manual Arts Association?

A:—Apply to Mr. C. E. Lang, Chicago, Ill., Secretary of the Association.

So Will We.

A Director of Manual Training writes: "I will appreciate it if you can give me information, thru your columns, or otherwise, concerning construction in concrete such as may be carried on in the upper grammar grades."

We shall be very glad to receive photographs and descriptions of problems, answering this description.—*Editors.*

Resetting Tires.

Colorado Springs, Colo. Q:—Please describe in the "Question Column" the method used in resetting tires on farm wagons.

A:—When the wheels are taken off, the right-hand ones are marked so they can be put back on the proper spindle when finished. The wheels are laid on the ground with the backs up. The tire is marked with a chisel, and the rim is marked opposite the cut on the tire. When replaced the tire goes in the same place where it came off. Front wheels should also be marked for each spindle. The tire is driven off by hammering on the back of the felloe. The tread of the wheel is measured by running around it with a tire traveler, which is a small wheel that can be purchased from dealers of wagon stock. The starting place is at a joint between felloes; when the wheel travels around the tread it must be stopped at the starting place and the traveler marked with a pencil. This gives the measurement of the tread. The tire is heated and squeezed up in a tire shrinker, and then run with the traveler. The tire must be from $\frac{1}{4}$ to $\frac{5}{8}$ smaller than the rim, depending on the dish in the wheel, which can only be learned by practice. If the tire is not too small it can be heated in the forge to expand it. A better practice is to heat them outside the shop with wood. They are then lifted out of the fire, and if hot enough they will drop on to the wheel, having the chisel marks opposite one another. The wheel should be set onto tressels and when the tire is on, water is used to prevent burning the wheel.

Drilling Holes in Glass.

B. G., New Orleans, La. Q:—Will you kindly tell me how to make some small holes thru window glass?

A:—There are several methods in use but a simple one is to drill the holes on a drill press. In doing this the ordinary flat drill, called the Diamond Point Drill, is used. The drill is simply a piece of round steel, flattened on end, and the angles of the cutting parts ground to a long bevel, leaving the drill quite pointed.

The drill is made very hard and run at a high rate of speed. Turpentine is used as a lubricator and when the point of the drill protrudes thru, the glass is turned over and the opposite side is drilled until the hole is of the desired size.—*S. V.*

Forging Problems.

T. R., Indianapolis, Ind. Q:—Is it possible to weld cast iron? Please answer this question thru the "Question Column" of your interesting magazine.

A:—It is not possible to weld cast iron in the same manner as wrought iron, but it is possible to fuse pieces together by heating in a forge. For instance, a broken cast-iron stove shaker, or some piece that need not be of the original length, can be used. The broken ends are put into a clean fire and brought to a red heat. A flux is then put on the ends and the heat raised to nearly the melting point. When in this condition they are brought to the anvil and the two ends pressed together. They must be held in this position until the metal sets, when it is allowed to cool. The rough edge around the joint can be ground off. This makes a fairly strong job.—*G. F. H.*

PORTLAND, ORE. A frame building, adjoining the Lents School, has been converted into a Domestic Science and Domestic Arts School. The upper portion is used for the cooking classes and the lower for sewing.